The Chemical Age

VOL LX 1 OCTOBER 1949 No 1577

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Catalyst for Britain

ONE of the basic materials for industry produced by our Avonmouth works (a section of which you see here) is vanadium catalyst. Until 1939, we made only enough for our own vast output of sulphuric acid ; now we make enough for sulphuric acid producers all over the country. And let's have no mock-modesty ! We spent eleven years (1928-39) perfecting our vanadium catalyst ; we know that nobody is producing a better catalyst for sulphuric acid ; and we very much doubt if anybody will—for quite a time, anyhow !

It has the utmost practicable hardness and strength. It has an ignition temperature of 395° C. (which helps to ensure an economical and efficient rate of reaction). It is produced in two sizes : (1) length 8-10 mm., diameter 6 mm. ; (2) diameter 4 mm. (when required). Please write to our Catalyst Sales Manager for further information.

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The
Chemical Age

The Weekly Journal of Chemical Engineering and Industrial Chemistry

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Stiffening Resistance

NEARLY a year has passed since the nationalisation of the chemical industry, or of Imperial Chemical Industries, Ltd., was being talked of in Socialist circles as a firm objective to be achieved sooner or later—and preferably soon. Much has happened since to make that proposal even more objectionable than it appeared to responsible opinion twelve months ago. Workers' discontent, poor performance and rising costs in some of the industries upon which the problematical benefits of State control have been conferred must inevitably have weighed heavily in inducing second thoughts in those who endeavour to control the course of official Socialist Party policy. Had they not, it is unlikely that the proposal which came to life with prospects apparently no less attractive than those which culminated in the Iron and Steel Bill would have received so little regard when the Labour Party conference discussed Socialist planning earlier this year. Little was said then about the attractions of a State chemical industry, but several other industries were named as the next in the list to become national concerns—among them the independent sugar refineries.

The similarity between sugar refining and some of the basic sections of chemical production is self evident. They share some of the same needs in fundamental equipment, their labour requirements differ only in the numbers involved and their products are prime essentials. According to the hasty political judgment, British sugar refining is "a monopoly." That was a phrase familiar no long ago in some of the propaganda brought to bear on chemical industry. That the implication it was intended to convey was equally misleading in both cases is another familiar element of similarity.

Those are some of the factors which permit a close analogy to be drawn between these two examples of doctrinaire policy, of which one is still being pursued, while the other—chemicals—is possibly pigeon-holed. None of its first supporters, one may be certain, considers it has been abandoned. In the two cases there has been, however, one very conspicious difference which richly deserves to be emphasised, because in it is the first heartening evidence that the principle of making sure the public knows all the facts of what it is proposed to do in their name is to be given the scope it deserves. To take in charge the chemical, steel, insurance or sugar industries and make them a possible charge on every payer of direct or indirect taxation (since

On Other Pages

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what are ostensibly assets commonly are revealed as liabilities under nationalisation) is conspiciously a matter of public interest. Yet in the instance of steel, and of chemicals when the latter industry was tentatively named, the public heard little or nothing of all the very good reasons why the Labour Party proposals should not be permitted to proceed to a deplorable finale for everybody concerned, despite the fact that such an end was clearly forseen by all who were fully acquainted with the facts.

The sugar industry is fortunate in having found in its largest group, Tate and Lyle, Ltd., and Lord Lyle of Westbourne, the sugar company's president, a leadership which has had no hesitation in appealing directly to the public, telling them all the facts about the sugar industry, the brief history of the "snap decision" to make a State enterprise of sugar and the most probable outcome if that policy is allowed to materialise. On behalf of the management of Tate and Lyle, Ltd., Lord Lyle recently offered to stockholders, and others in London, the most forthright and penetrating survey ever given of what is involved in implementing such a scheme as is now proposed.

So much is written and spoken about the merits of "putting all the cards on the table," while the dealer witholds half the pack; the Tate and Lyle statement brings renewed hope that from now on the public will in fact be told the full truth, without reservations, whenever it is again proposed to take vital industries out of the hands of the people fully qualified to operate them at a profit. Lord Lyle said he was intent on making the management's position clear to stockholders and, so wide has been the publicity given to it, his statement was in fact addressed to the country at large. "We intend," he said, "to carry on until the day comes when the planners and their public relations officers file into our offices and start organising production with minutes and memoranda. Our methods of personal contact and intimate knowledge of men and machines will be outmoded, and on that day each one of us will say a reluctant goodbye to the men with whom we have worked so long. Many of us will back our faith in free enterprise and start again."

As a statement of faith and as the first determined attempt to reveal in terms which all can comprehend what

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Notes and Comments

Dollars and Metals

THE optimism which has strangely characterised recent Government statements on the probable effects of declaring the £ to be worth $2.80 is unlikely to prove infectious, particularly in those quarters which have had good cause this week to study the effect, not of another penny on the loaf, but of increases of a very different order in the prices of many essential materials, notably non-ferrous metals and compounds and some imported chemical materials. The news given this week of the immediate reaction of copper, lead, zinc, tin and the precious metals, among which platinum for chemists and scientific instrument makers is raised immediately from £18 to £24 10s. per oz., will make necessary new production costing throughout a range of chemical and associated industries much wider than the primary purchasers of these metals. That alone is certain. What will be the ultimate result of the profound disturbance of balance between prime costs and the saleability of products in the hard currency markets is a forecast which few outside the Government would be willing to attempt at this stage. The recent advances of copper and lead by over £32 per ton, of zinc by about £20 and tin to the unprecedented level of £750 and upwards may conceivably be compensated by easier conditions in the dollar markets which, it should be noted, most competitor countries, however, will share. At home, where no such compensation can exist, a marked inflation of prices becomes inevitable.

Chemical Factors

THE case being urged for devaluation as a powerful aid to sales in the dollar markets—of the U.S.A. rather than Canada, which has itself adopted a protective measure of devaluation—can have very much less force for chemical manufacturers than it is expected to have for the direct export industries. To suppose that, even with the aid of a 30 per cent price reduction, British industrial chemicals can supplant North American productions in their own markets is merely fanciful, although certain accustomed coal chemical exports may well benefit. There remain the facts that the whole value of chemical sales to the U.S.A. in August was £60,400 which is approximately 1 per cent of this country's entire receipts for chemical sales to the world that month, while chemical imports from the U.S.A. for the same period cost £333,521. These are the considerations which will urgently confront many chemical manufacturers in the approaching months. There has been no evidence so far that the authorities at the Board of Trade have any proposals to set against the possibility that a steep price rise in an essential such as U.S. sulphur may seriously inflate the materials costs of the multiplicity of users of sulphuric acid.

Industrial Relations

IT is not without significance that the art-cum-science of procuring honest and satisfying team work in any large group of workers—which was the subject of acute and revealing contributions at the opening session of the Oil and Colour Chemists in London last week—hides behind a host of aliases. The subject, whose vital importance to all large groups in chemical industry is reflected in ways being rapidly multiplied—house organs, staff associations and consultations with apparently very successful results also suffers from the continual disability that the *bona fides* of any practical application in the works are usually suspect at first, regardless of the purity of the motives of those responsible. Absolute honesty and goodwill are the essentials—as the Colour Chemists' discussions did well to

emphasise—and management must conspicuously display their virtues before any corresponding return can be expected from others. It bears emphasising over again that what has been achieved in chemical industry, often in despite of conditions which provide workers with little scope for a sense of individual responsibility or personal achievement, bears comparison with anything attained in more favoured trades. How great is the need that the effective principles underlying these happy associations should take root in wider spheres is proved by the reference to the sort of events which currently make up much of the news of industry. The rôle of the chemist himself, fortunately not a matter of national importance, forms a much more complicated problem. While he usually seeks no benefit from the newer forms of the sharing principle, he is prone—as speakers in London readily recognised—to be regarded, unfairly, as "a back-room boy" unsuited to make a significant contribution in leadership or liaison. That belief is almost certainly a myth—but only chemists themselves can prove it is.

STIFFENING RESISTANCE

(*continued from page 442*)

unreflecting appropriation by the State of some vital activities may produce, the Tate and Lyle report deserves to be filed for widespread reference. Its context is in fact much wider than the sugar refining industry and many may tacitly have applauded the resolution passed unanimously by members of the sugar company in London. It deserves to be put on record: "Believing as we do that nothing but harm to workers, consumers, and stockholders alike can spring from the nationalisation of the sugar refining industry, the members of this company hereby empower the board of directors to do everything in their power to meet the threats of the nationalisers who, learning nothing from the chaos, losses, and labour unrest that they have created in other industries, now wish to seize the assets of the company."

Chemistry in the Air

AIR passengers marooned in B.E.A. waiting rooms may beguile their vigil by reading the official notices. Chemists will derive much amusement from one which begins "The Carriage of any of the following Articles by Air is Forbidden" (Form No. BEA—T 186, to be precise). This tells one, for example, that no acids may be carried except citric and tartaric (alginic acid is presumably ruled out). One returns to the beginning and passes "carbon bi-sulphide" with a frown, and is arrested by the headings "chlorate of potassium (potash), chlorate of sodium (soda)." They are being extra careful, it seems. "*Eau oxygenée*," the only heading in French, may have something to do with a preference for brunettes. Matches ("Lucifer percussion of all kinds") caters, supposedly, for those getting on in years who may respond to these old-fashioned terms. With natrium peroxide no synonym is given; it is followed by nitrate of soda—this time not sodium (soda) as with the chlorate. The hyphen in nitroglycerine may be there in the interests of clarity, but "nitro of lime calcium" is fabulous. The company will not carry saltpetre or arrack, and is probably particularly down on those wishing to despatch meal worms by plane. The imagination is stimulated by this notice, but chemists may wonder when their simple and orderly nomenclature will be adopted officially in Britain.

Schoolboy Politics

THE prominence of Sir Stafford Cripps in the news recalls a schoolboy "howler" which is included in the second revised edition of "The Best Howlers," compiled by Cecil Hunt and published by Ernest Benn, Ltd., last week (price 6s.).

The Chancellor of the Exchequer is described thus: "Sir Stafford Cripps is a lawyer who has been in labour ever since he entered politics."

AID FOR RESEARCH

I.C.I. to Give £12,000 to Pakistan

THE Pakistan Association for the Cultivation of Science has accepted an offer from Imperial Chemical Industries, Ltd., to provide 160,000 rupees (£12,000) for research fellowships in chemistry, physics and biology at Pakistan universities or institutions, over a period of five to seven years. Each fellowship will be worth about 400 rupees per month, and will be for two years, with a possibility of extension to three. In addition, fellowship holders would be given a grant to cover expenses for special apparatus and materials.

The Pakistan Association for the Cultivation of Science, will make appointments and control the fellowships, which will not distinguish between sexes, race, or religion; the overriding consideration will be scientific fitness for research.

In furtherance of its policy of encouraging fundamental research wherever facilities exist, I.C.I. has, since 1944, provided £48,000 a year for research fellowships at the universities of Birmingham, Cambridge, Durham, Edinburgh, Glasgow, Liverpool, London, Manchester and Oxford. The University of Leeds was added to the list in 1945 with an annual grant of £4800. In July this year a grant of £2500 per annum was made to St. Andrews University for the purpose of establishing a Hall of Residence for graduates and undergratuates engaged on research.

I.C.I. also makes grants of money to the chemical departments of universities for the purchase of chemicals and apparatus for research work, at a cost of about £25,000 per annum.

New Cheshire Oil Mill

THE foundation stone of a new oil mill at Bromborough, Cheshire, was laid recently for the British Extracting Company, a subsidiary of Lever Bros. and Unilever, Ltd. It is expected that it will be ready for operation towards the end of next year.

When completed, the mill will provide employment for about 120, excluding the clerical and administrative staffs and will be capable of producing more than 30,000 tons of oil annually from vegetable oil seeds, such as groundnuts.

The seeds will be unshipped directly into dockside tanks connected with the new mill, where they will be processed to afford principally soaps and margarine.

GERMAN TRADE BID

U.S. Forecasts

THE view that economic necessity will force Germany to make a strong bid for a share of the world chemical business was expressed recently in the U.S.A.

The chemical industry was a potential source of dollars to Western Germany, declared Major General John Hildring, U.S.A. (retired), in an address to a meeting of the Synthetic Organic Chemical Manufacturers' Association.

The speaker, who has been a foreign trade consultant since 1947 and was formerly assistant Secretary of State in charge of policy in Germany and other occupied areas, said that he was convinced that the new German Government would make as a minimal concession to its bid for re-election such financial adjustments as were necessary to get German chemical products moving in foreign trade.

The 30 cent mark, absence of subsidies, the United States tariff, and high mark production costs were cited by the speaker as the reasons why American producers had not yet felt the change in the German markets.

Returning from a two-months' trip, during which he visited the principal European chemical centres, Dr. Emil Ott, director of research for the Hercules Powder Co., Wilmington, Delaware, stated that he believed the German chemical industry was back on its feet, though he did not think the country would again lead the world in volume production of chemicals.

The U.S.A. had acquired world leadership in chemicals during the last war, declared the chemist, but Germany was proving an important supplier of special chemicals.

Record Steel Output

THE annual rate of steel production this year reached the record figure of 14,953,000 tons for the month of August, compared with the previous best rate of 14,117,000 tons in the same month in 1948.

Although production reached a record level last year, details issued by the British Iron and Steel Federation show that every month's output in 1949 has so far exceeded that of the corresponding month in 1948.

Pig iron production in August was at an annual rate of 9,477,000 tons, compared with 9,048,000 tons in August, 1948.

The standing record rate for steel output was reached last May with 16,409,000 tons.

NOXIOUS GASES

Proposed Changes of Legislation

A DRAFT order extending the list of noxious or offensive gases mentioned in the Alkali, etc., Works and Regulation Act, 1906, has now been prepared by the Minister of Health.

After a public inquiry and consultation with the local authorities and other interests concerned, under the powers conferred by the Public Health (Smoke Abatement) Act, 1926, it is proposed by the Minister that the following amendments be made.

The expression "noxious or offensive gas" in the Alkali, etc., Works Regulation Act, 1906(c), shall include (in addition to the gases or fumes already specified) volatile organic sulphur compounds; fumes containing carbonaceous particles from black production works; fluorine.

The descriptions in the first schedule to the Act of 1906 shall be extended so as to include the additional working shown in italic below:—

Sulphuric acid works—*or by any other process involving the use of oxides of nitrogen;* chemical manure works—*and works for the granulating of chemical manures;* bisulphite works—*and works (not being smelting works as defined in section 8, sub-section (1) of the Act of 1906 or other works defined elsewhere in this schedule) in which oxides of sulphur are evolved in any chemical manufacturing process;* cement production works—*and works in which cement clinker is ground or cement is packed.*

It is proposed that the list of works mentioned in the first schedule to the Act of 1906 shall be extended to include the undermentioned additional works:—

"Black production works, that is to say, works in which carbonaceous blacks are manufactured by the cracking or incomplete combustion of hydrocarbons, coal tar, petroleum or their derivatives.

"Fluorine works, that is to say, works in which fluorine or its compounds with other halogens are made or used in any manufacturing process.

"Acid sludge works, that is to say, works in which acid sludge produced in the refining of coal tar, petroleum or other hydrocarbon derivatives is treated in such manner as to cause the evolution of any noxious or offensive gas."

The public inquiry into the subject matter of the draft Order will be held by Mr. W. A. Damon, chief inspector under the Alkali, etc., Works Act, at the Ministry of Health, Caxton House East, Tothill Street, London, S.W.1, on Tuesday, October 18, at 2.30 p.m. Any interested person may attend.

(*continued at foot of next column*)

RIC AUTUMN PROGRAMME

"Careers for Chemists"

DETAILS of the autumn session of the Royal Institute of Chemistry (London and South-Eastern Counties Section) show the wide range of subjects to be covered in papers and discussions.

Among the joint meetings arranged are "Plastics and Corrosion" by H. Barron at the County Technical College, Dartford, with the SCI (October 17); "Chemotherapy and Essential Trace Elements" by Prof. A. Albert, with the Cambridge University Chemical Society (October 28); "Leather: Its Constitution and Properties," by M. P. Balfe, with the Welwyn Garden City Scientists' Club (November 22).

Following the success of last year's meetings for senior children and students, a further series has been arranged during the autumn and spring. Under the title "Careers for Chemists," the first two of these meetings will be held at the technical colleges at Brighton (November 3) and Norwood (November 8).

The annual general meeting will be held at the Royal Society of Medicine, London, on November 16, and the dinner-dance at the Connaught Rooms, London, on November 18.

INDIA LIMITS IMPORTS

ATTENTION is drawn by the Board of Trade to the belated publication in New Delhi of text implementing the new import licensing policy of the Indian Government for the current shipping period (July-December), which will have the effect of excluding a wide range of imports. Special licences may be issued in respect of certain categories, as in the case of goods covered by irrevocable letters of credit valid beyond September 15. Instruments, such as Wheatstone bridges, potentiometers, pyrometers and thermocouples are among the group for which licences will not ordinarily be issued. Other large categories will be subject to a quota based on past imports or to licensing only if they are shown to be essential. Subject to the former provision are a wide range of industrial and pharmaceutical chemicals. The schedules are reproduced in the *Board of Trade Journal* (2753, 600).

MITIGATING THE SMOKE NUISANCE

Case for Restricting Use of Bituminous Coals

THE importance and wide range of the work of the Fuel Research Station of the Department of Scientific and Industrial Research, were described by its director, Dr. A. Parker, at the conference of the National Smoke Abatement Society, held at Harrogate this week.

Dr. Parker observed that advances in the measurement of atmospheric pollution, now under the guidance of a committee of the Fuel Research Board, had been made through work carried out at the station, and there were now over 500 instruments in use in many parts of the country. With these, local authorities were making daily and monthly observations of deposited solid matter, pollution by smoke and sulphur and the intensity of daylight.

Dr. Parker recalled that the war work of the station had included the fitting of over 1000 merchant ships with a simple new device for preventing smoke emission from ships in convoy, the development of mobile gas producers for vehicles, flame-throwers, the production of hydrogen for barrage balloons, and research on the recovery of sulphur from pyrites to facilitate the manufacture of sulphuric acid.

The complete abandonment of the use of raw bituminous coal, or, alternatively, the licensing of its sale and use for approved purposes only, as being essential for the successful mitigation of the smoke nuisance, was the drastic course recommended by several speakers.

Ending Domestic Smoke

"In the battle against the old-fashioned open coal fire burning bituminous coal, victory is at last in sight," said Lord Simon of Wythenshawe, in his presidential address. Research and development in the production of more efficient heating appliances, the necessity to conserve fuel, and the more enlightened attitude of Government departments were reasons for confidence in the belief that in 30 years' time there would be no more domestic smoke.

With progress in the industrial sphere, said Lord Simon, there should also be the end of any serious emission of smoke from factories within that time, "so that we may look forward with reasonable confidence to the end of the smoke nuisance as a whole within 30 years."

Mr. Arnold Marsh, general secretary of the NSAS, opening the discussion on the reports presented by the representatives of the various regional smoke abatement committees, said that smoke control legislation in this country was 75 years out of date. It was based on the Public Health Act of 1875 and could be described as stable-door law. Nothing could be done to stop smoke until after it had been emitted. What was wanted now were powers to control the conditions that could result in smoke. Means to this end were the prior approval of all new fuel-burning plant, smokeless zones, and, as in the U.S.A., licensing the sale and use of bituminous coal for approved purposes only.

Smoke Means Waste

It was not only clean air we wanted, said Mr. Marsh, important though that was for health and because of the costly waste it involved. Smoke to-day, wherever it came from, was the visible sign of fuel being wasted and of production costs higher than they need be.

"As a rule, domestic smoke has a greater adhesive power than factory smoke because of its greater tar content; the effect of domestic smoke is proportionately greater in winter, and it may be confidently stated that domestic smoke is more pernicious in its attack upon human and vegetable life," stated Mr. Eric Sinkinson, lecturer in fuel technology at the University of Leeds. "Thus the combined effect of the two kinds of smoke in large centres of population is very disastrous."

Bituminous raw coal was really all we were offered readily for our fires, said Mr. Sinkinson, and if we burned it in closed-in stoves with greater efficiency than in open grates we created vicious black smoke. Only by completely abandoning raw bituminous coal for domestic use could we hope to mitigate the smoke nuisance and avoid the losses and waste by so doing.

Coal Output

Total coal production in Britain last week was 1800 tons less than in the previous week. Strikes are stated to have caused a loss in output of 55,400 tons. Comparative figures are:—Last week: 4,235,100 tons (deep-mined 3,960,400 tons, opencast 274,700 tons). Previous week: 4,236,900 tons (deep-mined 3,962,900 tons, opencast 274,000 tons).

TREND OF CHEMICAL EXPORTS

Further Shrinkage in August Totals

EXPORTS of chemicals from the United Kingdom in August once again reflected the general decline in overseas trading, and although there were increases in some commodities as against July, there was a general decrease compared with August, 1948.

Total value of exports for the month shown in the *Trade and Navigation Accounts of the United Kingdom* for August 1949 (H.M.S.O. 6s. 6d.) was £6,594,864 (£7,021,087), composed as follows: chemical manufactures and products (other than drugs and medicines) £3,317,883 (£4,145,129); drugs and medicines £1,521,733 (£1,239,109); dyes and dyestuffs £867.242 (£568,574); paints and pigments £888,006 (£1,068,275).

Despite a decline in the last two months, total exports for the first eight months of this year were valued at £57,565,484, an increase of £2,866,870 over the same period of 1948.

Representative totals are as follows:—

CHEMICAL EXPORTS

	Aug., 1949	Aug., 1948
	Cwt.	Cwt.
Formic acid	2,648	2,454
	Lb.	Lb.
Salicylic acid and salicylates	180,466	248,815
Value of all other sorts of acid	£90,658	£72,879
	Tons	Tons
Aluminium oxide	26	234
Sulphate of alumina	3,390	4,243
All other sorts of aluminium compounds	525	276
Ammonium sulphate	15,707	17,109
Ammonium nitrate	1,740	14,096
All other sorts of ammonium compounds	1,336	1,912
	Cwt.	Cwt.
Bleaching powder	8,373	51,288
All other bleaching materials	10,299	7,856
	Gal.	Gal.
Cresylic acid	107,833	212,567
Tar oil, creosote oil, anthracene oil, etc.	1,917,935	2,471,276
Value of all other sorts of tar oil	£46,714	£56,369
	Cwt.	Cwt.
Collodion cotton	1,920	1,213
	Tons	Tons
Copper sulphate	2,442	887
	Cwt.	Cwt.
Disinfectants, insecticides, etc.	43,652	40,749
	Tons	Tons
Fertilisers	1,072	1,553
	Cwt.	Cwt.
Nickel salts	5,779	2,456
	Cwt.	Cwt.
Lead acetate, litharge, red lead, etc.	4,981	9,751
	Gal.	Gal.
Tetra-ethyl lead	76,436	110,256
	Tons	Tons
Magnesium compounds	601	756
	Gal.	Gal.
Methyl alcohol	8,260	7,463
	Cwt.	Cwt.
Potassium compounds	6,033	7,115
	Tons	Tons
Salt	21,053	19,310
	Cwt.	Cwt.
Sodium carbonate	170,453	452,803
Caustic soda	187,467	227,549
Sodium silicate	15,008	11,608
Sodium sulphate	47,783	85,769
All other sodium compounds	78,116	96,070
Cream of tartar	528	350
Tin oxide	656	888
	Tons	Tons
Zinc oxide	991	1,109
Total value of chemical manufactures, excluding drugs and dyestuffs	£3,317,883	£4,145,129
	Oz.	Oz.
Quinine and quinine salts	186,159	159,629
	Lb.	Lb.
Acetyl-salicylic acid	63,594	111,760
	100 International Units	100 International Units
Insulin	2,199,070	424,038
	Mega Units	Mega Units
Penicillin	697,546	424,457
Total value of drugs, medicines and preparations	£1,521,733	£1,239,109
Total value of dyes and dyestuffs	£821,241	£530,411
	Cwt.	Cwt.
Plastic materials	37,330	31,697
Value	£456,497	£414,281
	Cwt.	Cwt.
Chemical glassware	1,086	1,191
Value	£52,462	£40,759
	Cwt.	Tons
Fans	3,786	161
Value	£101,365	£106,230
	Cwt.	Tons
Furnace plant	3,742	223
Value	£58,847	£56,848
	Cwt.	Tons
Gas and chemical machinery	26,350	808
Value	£273,257	£150,656

CHEMICAL IMPORTS

	Aug., 1949	Aug., 1948
	Cwt.	Cwt.
Acetic anhydride	4,805	7,921
Acetone	—	5,827
Acetic acid	—	23,332
Boric acid	6,400	2,200
All other sorts of acid	4,440	4,569
Borax	24,001	3,600
Coal tar products (excluding benzol and cresylic acid)	5	651
Cobalt oxides	625	136
	Tons	Tons
Fertilisers	205	266
Glycol ethers and glycol ether-esters	96,609	750,094
Iodine	—	132,100
	Cwt.	Cwt.
Potassium chloride	674,788	813,530
Potassium sulphate	32,560	10,340
All other potassium compounds	5,235	4,024
Sodium nitrate	39,880	39,881
		Tons
Sulphur	—	44,002
All other sodium compounds	11,155	3,865
Carbon blacks (from natural gas)	32,044	68,927
Total value of chemicals, drugs, dyes and colours	£1,566,361	£2,672,007

The Netherlands Salt Industry

The Water-Injection Method of Recovery

by JOHN GRINDROD, B.A.,(Com.)

THE first salt factory of the Royal Dutch Salt Industry (N.V. Koninklijke Nederlandsche Zoutindustrie) is situated at Boekelo, surrounded by woods and heather, in the province of Overijsel, about 15 km. from the German frontier station of Gronau.

The second and more modern works is near Hengelo on the Twente-Rhine Canal. The winning of salt in the Netherlands does not depend upon the underground cutting of rock salt. The great depth of the seams, some of them 300-400 metres below ground level, makes this method far too costly.

The Dutch industry is based on the method of injecting water into the seams and forcing the resultant brine to the surface. This, too, is comparatively costly, but refined salt is produced in one operation, by evaporation

Supplementing the production of refined salt, there has grown up a related chemical industry, making caustic soda, carbonate of soda, sulphate of soda, nitrate of soda, chlorine and derivatives, etc.

Refined Salt Exports

While raw salt is imported into the Netherlands from Portugal for industrial purposes such as fish preserving, a good deal of the refined Dutch product is consumed abroad.

Salt is, of course, present in solution in all sea waters and those of certain lakes. The North Sea contains 2 to 3 per cent of salt. The Mediterranean contains 4 per cent or more. Where evaporation becomes more and more extreme, as in the Dead Sea, saturation point of about 300 gr. of salt per litre of water is reached. If concentration still continues, the salt crystallises and is deposited on the floor of the sea to form, in time, a bed of salt. In the course of centuries such beds may be hundreds of metres thick and, becoming part of the earth's crust, may sink to a depth of up to 1000 metres. Under the enormous weight which then covers this saline strata the salt becomes compressed, moisture escapes and rock salt results.

Such a bed of rock salt was found accidentally, both at Boekelo and Hengelo in the Netherlands, at a depth of 325 to 400 metres.

(*continued overleaf*)

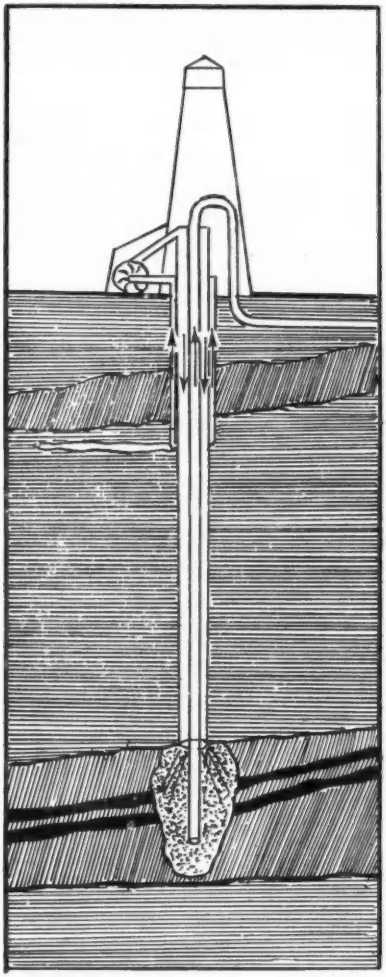


Fig. 1

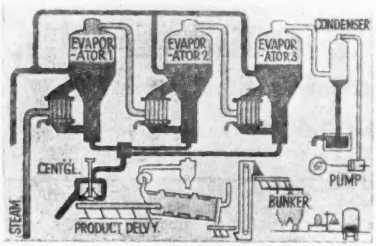


Fig. 2

The bed at Overijsel was discovered during a search for water in 1885, but the owner of the land concealed the fact, fearing the conversion of his countryside into a mining and industrial centre. The existence of the salt finally came to the knowledge of M. J. P. Vis, who was associated with the firm of Kolff and Vis M. Vis, and who conceived the idea of making Holland independent of imported salt.

Soundings were made at Eibergen, but were abandoned in 1903 after reaching a depth of 751 metres. A second sounding was precluded by the operation of a law passed in 1903 by virtue of which mineral research became exclusively vested in the State for 20 years.

In 1909 State prospectors made furthur drillings and salt was found near Winterswijk and near Buurse. The earlier private prospectors applied for the concessions to work both places, but as coal had also been disclosed under the bed of salt at Winterswijk, the Government would consider granting a concession only for the Buurse drilling. After some compromise this was granted in 1918. An exploitation agreement was then drawn up between the Government and the "Royal Netherlands Salt Industry."

Further soundings were taken, a factory was erected and a year later the first refined salt was produced. The following table shows the results of the first drilling of the K.N.Z.

Depth (in metres)	Thickness (in metres)	Beds found	
0.0 — 7.7	7.7	Yellow and grey sand	Diluvian
7.7 — 63.7	56.0	Heavy green and grey clay accompanied by sand and having underneath a large content of sand and water.	Tertiary
63.7 — 86.3	22.6	Shell marble.	Trias
86.3—324.95	238.65	Mixed red and grey sandstone alternating with beds of shale containing clay and with anhydrite.	Trias
324.95—327.9	2.95	Impure rock salt (1st bed)	Trias
327.9 —332.5	4.6	Anhydrite	Trias
332.5 —354	21.5	Impure rock salt (2nd bed)	Trias
354.0 —355.36	1.36	Red and grey shale with anhydrite	Trias
355.36—358.45	3.09	Impure rock salt (3rd bed)	Trias
358.45—359.9	1.45	Anhydrite.	Trias
359.9 —400.4	40.50	Rock salt (4th bed of salt)	Trias
400.4 —401.1	0.70	Aphydrite	Trias
401.1		Old variegated sandstone	

Other drillings were found to be almost similar.

The raw product of K.N.Z. is the "Röt" salt belonging to the Trias of the secondary geological epoch. The salt revealed by the borings of the Society of Mining Works, near Groenlo (concession Gelria) and by the State prospectors near Winterswijk belong to the Permian of the first geological epoch. It is probable that, under the Röt salt in the concession Buurse, there might also be found, at about 1000 m. depth, a Permian salt, and still further down again coal.

The concession Buurse is so rich in salt that there is enough to last for 80 years, even if exploitation reached 25 million tons per year—roughly the entire world consumption of salt for all purposes. This, moreover, is only one of several salt regions.

These successful borings have been partly percussion drilling with a chisel and partly rotatory drilling with a diamond crown. Using the latter method, as soon as the drill reaches the bed of salt a steel tube is lowered as far as the upper side of the salt bed. (Fig. 1.) This tube is hermetically sealed in the rock. A thinner tube is then introduced into the first and is projected to the bottom of the salt bed. Water pumped down the exterior tube comes into contact with the rock salt, forms a saline solution and is forced to the surface through the interior pipe. Thence it is conveyed by pressure in an iron conduit of 2½ km. to the factory where it is received in gauged reservoirs. The salt content of the brine is established and excise duty is paid on the quantity thus determined.

From the gauged reservoirs the brine is transferred to refining tanks where noxious matter is eliminated by chemical action. The brine is then put into vacuum apparatus which is then sealed.

In three sealed pans, the brine is freed from water by evaporation. After having been transferred mechanically from the pans to centrifuges the salt is dried to

(*continued overleaf*)

Italian Experience with Methane

Its Use in Thermo-Electric and other Plants

A SUMMARISED report of the proceedings of the 4th National Methane Congress, Padua, Italy, held this summer, has been published (*La Ricerca Scientif.*, *19* (7), 727-731). Some fifty papers were presented in five sections: direct and indirect research, compression and transport, geology, industrial uses, and production. Brief reference was made in the first to the Eltran and Matran methods of electro-magnetic conduction described in the paper by Prof. Arnaldo Belluigi.

The principal subject of interest in connection with transport was corrosion, on which several papers were read, including one by Bernard Heuzé of the Société d'Etudes sur la Corrosion, of Paris, and others by Italian engineers. Fifteen papers covered the industrial uses field. G. Bosinelli, director of the Communal Gas Works of Padua, dealt with the domestic use of methane, from which it appears that a mixture of coal gas and methane has proved very satisfactory. F. A. Choffel (U.S.A.) discussed problems of methane compressors, and on the basis of considerable American experience stated that it has been found that the new type of combined compressors are more economical in use.

Prof. C. Codegone, director of the Technical Physics Institute, Turin, read a paper on methane compression, illustrating the laws of iso-entropic compression, and recording some results with mixtures of varying methane content. Other papers in his section dealt with the use of methane in Italian transport, *e.g.*, by the FF.SS. on the Rovigo-Chioggia, etc., line.

Prof. M. Medici described results so far obtained with thermo-electric plants run on methane, using turbines, on either open, closed or semi-closed circuits. In another paper—by Ing. G. Minucci, technical director of the Soc. Idrocarburi Naz. di Firenze (Florence)—some interesting cost figures for actual running were given for turbine plants up to 2000 kW.

Ing. F. Parisini, of Bologna, illustrated different types of valve for high pressure methane containers. Prof. G. Pastonesi dealt with the subject of hydrogen manufacture from methane, but his data was mainly foreign rather than Italian. No details are given in the summary.

Other papers in the section related to the use of methane as fuel in agricultural tractors, and with various combinations of methane with other sources of fuel in the design of power stations (Ing. S. Sestini, of the Soc. Pignone, of Florence). Several papers on power methane included those of Prof. I. Tessari (Trieste University); Ing. L. Varriale, of the Ansaldo firm, Genoa; Ing. Gh. D'Ambrosio, of Cisa-Viscosa; M. Zancanaro, of Soc. Impianti Idrotermici, of Padua; and Ing. G. Pavani, of the Dalmine metallurgical works.

Visits by delegates were paid to the works of Cisa-Viscosa, Padua gasworks, and other factories in the neighbourhood. A methane exhibition was also organised.

On the important subject of production and Italian reserves of natural gas, the racconteur does not say much in his summary, beyond mentioning the names of a few authors who were largely concerned with professional training in this field.

THE NETHERLANDS SALT INDUSTRY

(*continued from previous page*)

contain no more than 3 per cent moisture. It is then dried by contact with warm air until it contains less than 0.1 per cent moisture. All this is done mechanically. (Fig. 2.)

To distinguish between ground rock salt and refined salt it is sufficient to examine them both by magnifying glass. Refined salt is composed of regularly formed crystals while the rock salt has no regular crystal pattern.

If a little salt produced is dissolved in water the crushed salt is also found to contain 1 to 2 per cent of insoluble substances. The refined salt produces a clear solution and contains 99.4 per cent Na Cl.

From an output of 25,000 tons in 1920, the total production of K.N.Z. in 1947 was increased to 240,000 tons. Production in 1948 was approximately 247,500 tons, about 20 per cent over the pre-war output.

At the original Boekelo works an artificial sea water swimming pool with artificially maintained salt content and a wave generating appliance has been built.

The more recent works in the Twente-Rhine canal are within reach of coasting vessels, providing cheap transport for the refined product.

NEW META ALKYL PHENOLS

Cashew Nutshell as a Source of Varied Derivatives

From A CORRESPONDENT

THE main constituents of cashew nutshell liquid are phenolic in nature and contain a high proportion of monohydric meta-substituted phenol, a proprietary form of which is known as Cardanol and is used for making synthetic resins. A new development is the hydrogenation of the liquid to produce two meta alkyl phenols, the 3-pentadecyl phenol and 5-pentadecyl resorcinol. The former compound can be obtained in a yield of approximately 45 per cent of the cashew nutshell liquid, while the 5-pentadecyl resorcinol is produced in a yield of approximately 5 per cent.

Solvents and Special Resins

Some of the uses for these products include conversion to oil additives, antioxidants for petroleum fuels, and mutual solvents for the rotenone-containing resins with petroleum hydrocarbons, these solutions being used for insecticidal purposes. Interesting new heat-reactive resins can be made by a one-stage process from these phenols.

The 3-pentadecyl phenol is a waxy solid, pale amber in colour. It has a melting point of 49°-51° C. and a boiling range of 190°-195° C. at 1 mm. mercury. This phenol is insoluble in water and aqueous alkalis but is very soluble in organic solvents, including aliphatic hydrocarbons.

The 3-pentadecyl phenol forms heat-reactive resins with an equi-molecular amount of formaldehyde and using either acid or alkaline catalysts. These one-stage resins while in the fusible stage are readily soluble in hydrocarbons, including the aliphatic, such as naphtha or mineral spirits. They are being examined for use as coating resins.

Hydrogenated Cardanol sulphonates very easily when heated with concentrated sulphuric acid at 125° C. (preferably under vacuum). When complete water solubility is reached, after about two hours, the hot mixture is poured into heptane, the solution heated for complete solution, and then cooled to cause crystallisation of the sulphuric acid which is recovered by filtration.

The sulphonated product is readily soluble in water and is soluble in all the organic solvents except the aliphatic hydrocarbons (cold). The sodium and potassium sulphonates are practically insoluble in water but are soluble in a wide range of solvents. These sulphonates are suggested as additives for dry-cleaning fluids.

Interesting nitro compounds are obtained from 3-pentadecyl phenol by treatment of a solution of hydrogenated Cardanol in chloroform with fuming nitric acid. Both 4-nitro and the 6-nitro-3-pentadecyl phenols are obtained, the first named having a melting point of 71.5°-72° C. and the 6-nitro compound a m.p. of 43°-44° C. A tri-nitro derivative can be prepared by utilising the disulphonic acid. These three nitro compounds are soluble in practically all the common organic solvents, with the exception of cold aliphatic hydrocarbons for the 4-nitro phenol and of the lower aliphatic alcohols for the 6-nitro compound.

The most important amino derivative is the 4-amino-3-pentadecyl phenol made by reducing the nitro derivatives with hydrogen and Raney nickel catalyst in ethyl acetate solution. The pure 4-amino compound has a m.p. of 105.5°-106.5° C., while the pure 6-amino phenol has a m.p. of 133°-134° C.

The Irvington Varnish and Insulator Co., of New Jersey, U.S.A., reports that the 4-amino-3-pentadecyl phenol is likely to assume considerable importance as a gum inhibitor in petrol.

Wax Uses

The lower alkyl ethers of 3-pentadecyl phenol are low melting solids, the higher alkyl ethers (up to octyl) are liquids, and the higher alkyl ethers, such as lauryl and stearyl, are solids of increasing melting point. An interesting waxy ether, unaffected by boiling alkalis, is prepared by combining 2 moles of anhydrous sodium salt of hydrogenated Cardanol with 1 mole of 1, 4-dichlorbutene.

This wax has a m.p. of 71°-73° C. and is insoluble in the lower alcohols but soluble in hydrocarbons. It is possible that this waxy ether may be of interest for improving the alkali resistance of wax preparations for treating floors, polishing car bodies, and finishing leather.

The 5-pentadecyl resorcinol is a waxy solid having an iron or greyish white colour. Its molecular weight is 320, its melting point 91°-93° C., and its boiling range is 220°-225° C. at 1 mm. mercury.

VERSATILITY OF DICYANDIAMIDE

Many New Industrial Uses

From A CORRESPONDENT

ONE of the most versatile of new nitrogen chemicals is dicyandiamide or cyanoguanidine. Although first prepared in 1851 by Cloez and Cannizzaro, it was not until 1858 that its properties were studied by Beilstein and Geuther. Until the last fifteen years this chemical has been mainly of academic interest, but to-day it is being produced in bulk for use as an intermediate in the manufacture of plastics, drugs, starch products, dyestuffs, and textile chemicals, for case-hardening steel, fireproofing paints, etc.

Dicyandiamide, $H_2N(HN)CNHCN$, is prepared commercially by the dimerisation of cyanamide in the presence of bases (Osborne, U.S. Patent 2,416,542-5, 1947). Cyanamide, H_2NCN, a colourless soluble crystalline substance (m.p. 40° C.) is itself made by heating calcium carbide in nitrogen at very high temperatures.

$$CaC_2 + N_2 \xrightarrow[\text{arc}]{\text{electric}} Ca\,NCN + C.$$

$$Ca\,NCN + CO_2 + H_2O \longrightarrow CaCO_3 + H_2NCN$$

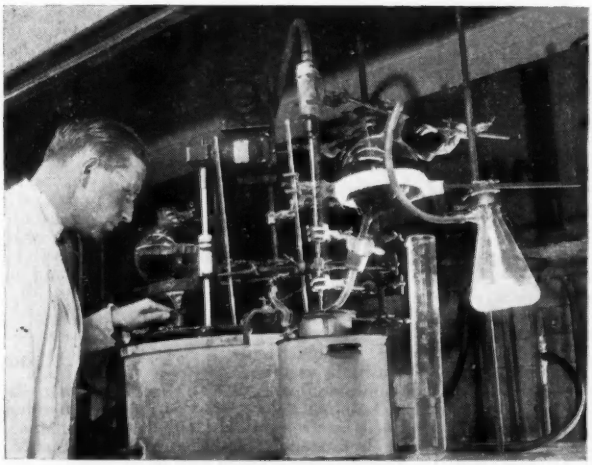
$$2\,H_2NCN \xrightarrow[H_2O]{OH} H_2N\text{-}C(=NH)\text{-}NH\text{-}CN$$

The dimer, dicyandiamide, is a colourless, crystalline solid with a melting point of 209° C. (decomposition temperature) and a density of 1.404-1.405 at 14° C. It is a non-volatile substance and freely soluble in water, ethyl and methyl alcohols. Dicyandiamide reacts with acids, both organic (in non-aqueous media) or inorganic (in very concentrated aqueous solutions) to precipitate the salt. These salts are practically completely hydrolysed in aqueous solution. The dimer is an amphoteric compound and reacts with alkalis as well as acids; with the alkali and alkaline earth hydroxides it forms salts.

In 1834 the famous chemist Justus von Liebig synthesised melamine, but it was not until over a hundred years later that this triamide of cyanuric acid assumed any importance. To-day melamine, which is made by the pyrolysis of dicyandiamide or reaction with ammonia and amines at high temperature, finds uses in many fields, particularly synthetic resins, coatings, tanning agents, ion exchange resins for water purification, etc.

Pyrolysis can give a 50 per cent yield

(*continued overleaf*)

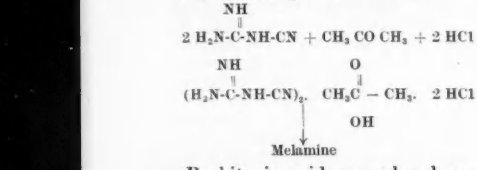


Depicting one of the stages in the Glaxo Laboratories during the manufacture of "thyroxine," active chemical of the thyroid gland, which has now been prepared by synthesis on a commercial scale. L-thyroxine-sodium Glaxo, which is the pure crystalline hormone presented in accurate dosage by weight, 1 mg., representing the thyroxine content of about 1 gr. of thyroid BP. The preparation is capable of having important effects in accurate treatment of thyroid deficiency

of melamine (2,4,6-triamino-1,3,5-triazine), but better yields can be obtained by use of anhydrous solvents; liquid ammonia and ethanolamines have been recommended. When dicyandiamide is heated under pressure with amines, substituted melamines along with some melamine can be obtained (Keller and Korten, U.S. Patent 2,222,350, 1940).

Melamine Synthesis

MacLean (U.S. Patent 2,402,061, 1946) developed a method of making melamine at low temperature and without the use of pressure by reacting dicyandiamide with acetone and hydrochloric acid for 2-3 hours at 15°-30° C. to form a complex which on treatment with alkali at room temperature gives melamine.



Barbituric acid or malonyl urea is now being produced from dicyandiamide, which is also the starting point for the synthesis of a number of guanidine salts; *e.g.*, guanidine nitrate has been prepared in over 90 per cent yields on a commercial scale by reacting the dimer and ammonium nitrate in liquid ammonia at 160°-165° C. under pressure. This method has been described by Paden, Martin and Swain, *Ind. Eng. Chem.*, 39,952 (1947).

Quantitative yields of aryl biguanide salts are obtained by reacting dicyandiamide with an aromatic amine and an equivalent amount of mineral acid in water at 75°-100° C. (Curd and Rose, British Patent 581,346, 1946). A recent British patent (Jacobs and Jolles, 587,907, 1947) covers the production of aryl biguanide salts by refluxing the dimer with an aromatic amine and an inorganic acid, in an anhydrous medium such as a tertiary amine.

Biguanide

Quantitative yields of alkyl guanidine salts can be obtained by fusing aliphatic amine salts with dicyandiamide at 180° C. for three hours (Phillippi and Marsh Ber. 60B, 2120, 1927, and Merner and Bell, J.Chem.Soc. 1922, 1790). High yields of biguanide can be obtained by reacting dicyandiamide with ammonia and an equivalent amount of copper sulphate, the pure biguanide being obtained by treating the copper compound with hydrogen sulphide and subsequent treatment with alkali to afford biguanide and sodium sulphate.

By condensing dicyandiamide with disubstituted malonic acids, it is possible to produce the cyanimino pyrimidines. When these are alkylated they can be hydrolised to N-mono-alykl-5, 5-disubstituted barbituric acids. Taub and Kopper took out a patent in 1933 (German patent 590,175) to cover this synthesis.

In the production of starch adhesives this nitrogen compound is being used for modifying physical properties. Adhesives made from converted starch products show high tackiness and wet grab when treated with dicyandiamide. Another fairly recent application of the dimer is as a thinner for oil well drilling muds. It has also found some use as a stabiliser in alkyl aryl sulphonate soaps to prevent deposition of solids at high temperature.

Patented Uses

There are now many patents covering new uses of dicyandiamide. Several of these disclose the application of the halogenated compounds for disinfecting, cleaning and sterilising purposes. Muskat and Chenicek (U.S. Patent 2,299,069, 1942, and U.S. Patent 2,184,888, 1939) first prepared mono and polyhalogenated dicyandiamide. It is considered that the halogen probably replaces the hydrogen in the amino or imino-nitrogen as the products contain "active" or positive halogen, up to 87 per cent active halogen being present.

The American Cyanamid Company has taken a prominent part in the development of dicyandiamide as an industrial chemical and a number of key patents have been taken out in their name. Some of these suggest uses in many unrelated fields, such as the manufacture of soldering flux; rubber chemicals; additive to shellac for moulded insulators; development accelerator in photography; stabiliser or inhibitor for nitrocellulose; manufacture of vinyl vinylidene chloride co-polymers; explosives, and for processing fats and soaps.

In its commercial form dicyandiamide has a purity of about 99 per cent, with moisture content 0.2 per cent and insoluble matter not more than 0.1 per cent insoluble in water. The compound is stable when dry and in neutral solutions up to temperatures of 80° C. Aqueous solutions may be held at 150° C. for short intervals.

Golden Jubilee

More than 3500 employees and their families attended the 50th birthday celebrations of the Leathercloth Division of I.C.I., Ltd., at Walker Lane sports ground, Hyde, Cheshire, on September 24.

WORLD OIL PRODUCTION

First Decline Since the War

AFTER a period of unparalleled expansion during recent years, world production of crude oil declined in the first half of the current year—the first decline since the end of the war, states the *Petroleum Press Service*. It can be estimated from figures already available that world supply will have amounted to about 232 million tons, or 6 per cent less than the all-time peak reached in the second half of 1948. However, the figure for the first half of this year (in metric tons) was still substantially higher than that for the same period of last year.

U.S. Reduction

Output continued to increase in many countries, though at a slower rate, and the decline in world production is accounted for by a fall of over 11 per cent in the U.S.A.—the world's leading producer—from 143,693,000 tons in the second half of last year to 127,656,000 in the first half of this year and 133,497,000 tons in the first half of 1948.

The U.S.A. share in the world total thus dropped to 55 per cent, against 60 per cent and more for a number of years. This decline reflects a sharp curtailment of production, which reduced demand and congestion of stocks made necessary. Since Venezuela depends on the U.S. market for an outlet for her crude oil, the decline in the U.S.A. enforced a lower output in Venezuela, the world's second largest producer, from 36,011,000 to 31,998,000 tons.

U.S.S.R. Supplies "Disappointing"

Petroleum output in the Soviet Union is officially stated to have risen by 10 per cent in the first quarter of this year and by 12 per cent in the second quarter, compared with the same quarters of 1948. It is admitted that supplies remain disappointing when contrasted with the country's quickly expanding requirements. There is indeed little prospect of attaining the target of 35.4 million tons during the current year which the Russian authorities some time ago considered essential.

It is interesting to note that the combined ouput of the Middle Eastern countries (excluding Egypt) rose from 25,425,000 tons in the first half of 1948 and 32,040,000 tons in the second half of last year to 35,103,000 tons in the half-year under review, thus, for the first time, surpassing, by over 3 million tons, Venezuela's output. The general rate of expansion, however, has been slowed, even in this prolific and expanding area, chiefly because of marketing difficulties in the Eastern Hemisphere. Iran is still the largest producer in this area and there was a further, though smaller, increase in the output of Saudi Arabia. Production in Kuweit, however, leapt from 4,327,000 tons in the second half of 1948 to 6,162,000 in the first six months of this year. Kuweit is thus the sixth largest oil producer.

Operations in Iraq are still hampered by the closure of the pipeline to Haifa. Developments in Egypt have been influenced favourably by the discovery of oil in the Sinai Peninsula.

Mexico continues to suffer from the lack of capital and technical assistance. The slight gain in the second half of last year has not been fully maintained this year, but her official spokesmen remain optimistic about the future. Her output in the first half of this year was 4,150,000 tons.

Progress in Indonesia

Further progress was made in the reconstruction of the older Indonesian oilfields and new fields were opened up in Dutch New Guinea. If the growing output of British Borneo (1,660,000 against 1,570,000 tons) is taken into account, the combined yield of the archipelago is already well in excess of its pre-war rate of over 8 million tons a year.

The expected "new era" in Rumania's oil production has not materialised; indeed, output, estimated at 2,070,000 tons, was substantially lower than the figures for the second and the first half of 1948.

South American Recovery

Most of the smaller South American producers have been moderately successful this year. Colombia made headway after the setback through strikes in the earlier part of 1948. The older Argentinian fields are giving smaller returns, but the Y.P.F. is endeavouring to balance this by new discoveries. The slow upward trend in Peru, which started in 1947, is continuing. Prospecting in Ecuador has not as yet affected output. Minor increases have been registered both in Bolivia and in Brazil.

CONTINUED GROWTH OF S. AFRICAN CHEMICALS

Large Production of Fertilisers Begins

THE new African Explosives and Chemical Industries plant at Umbogintwini began production this month, yielding more than 1000 tons of superphosphates a day. Work on the £1 million extension is almost complete. Part of the new machinery is working, and it is probable that the major portion of the plant, with an annual capacity of 410,000 tons of superphosphate, will be in production before the end of the month. The production target is five times the 1939 output. This will be one of the largest phosphate units in the world, and certainly the largest in Africa. According to the *Monthly Bulletin of Statistics*, during the 1946-47 financial year the output of private fertiliser works in the Union rose from £4,027,145 to £4,165,656. Only 40 per cent of the materials used in these factories was derived from local sources.

* * *

The other significant current development by AECI is the erection of a plant to produce a further 26,000 tons of ammonia, equivalent to 21,400 tons of nitrogen. This tonnage should meet in full the current requirements of the Union, both for agricultural and industrial purposes. Potash, the third essential element of plant food, will still have to be imported. The manufacture of nitrocellulose lacquers has just begun at Somerset, West, 30 miles from Cape Town, where the plant has been planned on a scale sufficient to meet all the Union needs in such lacquers.

* * *

The Cape Chamber of Industries believes that new import exchange quotas for the first half of next year may be issued in November. It does not expect that manufacturers' allocations will be bigger than they are for the current half-year. The Director of Imports and Exports has informed the Association of Chambers of Commerce that quotas and import permits for the non-sterling area may be transferred to the sterling area, provided that the directorate's permission is obtained in each case.

* * *

The New York Ore Trading Corporation recently completed an agreement under which it will take the entire manganese output obtained by the National Mining and Exploration Co. (Pty.), Ltd., and by its subsidiary, Western Manganese (Pty.), Ltd., at Posmasberg. It is estimated that there are millions of tons of high-grade manganese, representing a potentially important dollar earner for the Union. The American corporation has invested a large amount of capital in the development of these South African deposits and also sent out an expert to develop and mechanise the operations.

* * *

A recommendation for the remission of the Customs duty, of 2d. per lb., on fish and shark livers and marine oil-bearing tissues has been made by the Board of Trade and Industries. This recognises the claims recently advanced by the processers—that 70 per cent of the extracted oil is normally sold to the British Ministry of food and that practically the whole of the balance goes to the same destination. They have been asked to increase supplies to supplement vitamin A resources in Britain and Europe. The firm principally concerned has explored other sources of supply and obtained supplies of livers and marine tissues from other African coasts. The duty bore heavily on the costs of production of vitamin oils, placing them at a disadvantage as compared with oversea producers. The industry has lately undergone important developments in technique and scale-production and is recognised as an important supplier of the export market.

* * *

Dyeing and finishing, including "crease-resisting" facilities, said to be equal to overseas standards, are being offered to the textile trade by a Johannesburg firm of dyers, bleachers and finishers, which has installed further new plant, costing over £100,000, and opened new departments.

* * *

S.A. Pulp and Paper Industries, Ltd., Johannesburg, has begun the manufacture of ferric chloride, the compound for which engravers, printers, etc., have had previously to depend upon imports.

Metallurgical Section

Published the first Saturday in the month

Metallurgical Section

1 October 1949

STEEP ADVANCES IN METAL PRICES

Parity With the U.S.A. Still Sought

PURSUING its policy of endeavouring to maintain parity with U.S. base metal prices, despite the devaluation of the £ sterling, the Ministry of Supply announced last week new increased prices chargeable to domestic buyers. The new levels, which include freight and other charges, per ton delivered, are:—

Electrolytic copper £140 (£107 10s.).

Good soft pig lead £122 (£87 5s.).

Good ordinary brand zinc £87 10s. (£63 10s.).

Aluminium £112 (£93).

The Ministry has at the same time raised its buying price for rough copper to £110 per ton from £77 10s. per ton, the level ruling since July 28.

New selling prices for copper and lead, allowing for freights, are a little below dollar parity at the new rate. Zinc price corresponds with the current price of 10 cents per lb.

Government Tin Buying to End

Bulk purchase of tin by the Ministry of Supply is to end as soon as alternative arrangements can be made—states the Ministry. Meanwhile, the selling price of tin (99-99.75 per cent) in the United Kingdom is increased by £181 a ton to £750.

Levels, per ton, for other special grades in the U.K. are: Refined tin 99.75 per cent minimum, £757; refined tin 99.9 per cent minimum, in 28-lb. ingots, £760; grain bar tin, £770; granulated tin, £775.

It was announced at the beginning of this week that the price of platinum has been increased from approximately £18 to £24 10s. per oz.

The price of nickel was raised last week from £224 to £321 10s. per ton delivered U.K. works in order to bring the price into parity with the 40 cents per lb. price ruling in the U.S.A.

Ministry of Supply selling prices for imported copper rods and special shapes will be subject to additions per ton to the basis price per ton of copper as follows:—

	£	s.	d.
Black hot-rolled copper wire rods (not less than ¼ in. or more than ⅜ in. in diameter)	14	0	0
High-conductivity electrolytic copper, tough pitch copper in the form of—			
(*a*) Vertically cast cakes:—			
(i) of not more than 800 lb. in weight and not less than 3 in. in thickness	2	10	0
(ii) of more than 800 lb. in weight but less than 1000 lb. in weight	2	17	6
(iii) of more than 1000 lb. but not more than 1500 lb. in weight	2	17	6
(iv) Deoxidised of 1000 lb. in weight	8	2	6
(v) Silver bearing of 300 lb. in weight ...	6	10	0 plus silver content
(vi) Silver bearing of 1000 lb. in weight ...	6	17	6 plus silver content
(vii) Oxygen-free high-conductivity of 300 lb. in weight	10	12	6
(*b*) Wire bars vertically cast:			
(i) Sizes from 155 lb. to 545 lb. in weight ...	2	10	0
(ii) Sizes from 750 lb. to 800 lb. in weight ...	3	5	0
(iii) Silver bearing of 275 lb. to 545 lb. in weight	6	10	0 plus silver content
(iv) Oxygen-free high-conductivity	9	7	6
(*c*) Billets of:			
(i) 3 in. or more but less than 4 in. in diameter	9	15	0
(ii) 4 in. or more but less than 7 in. in diameter	8	10	0
(iii) Phosphorised 3 in. in diameter	10	10	0
(iv) Phosphorised 4 in. and upwards in diameter, plain phosphorised or OFHC phosphorised, or plain OFHC	9	7	6
(v) 3 in. in diameter	10	10	0
(vi) 4 in. in diameter and over	9	7	6

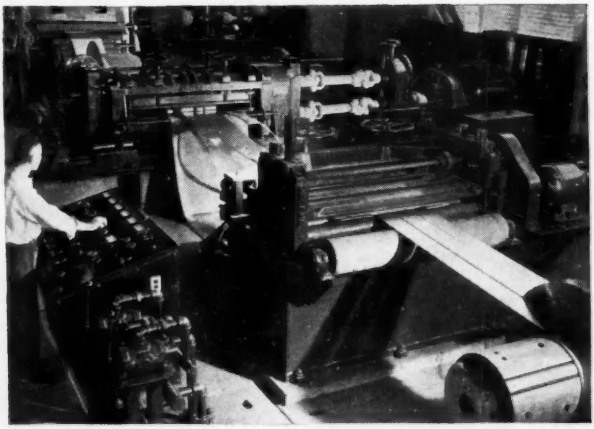
In addition to the new prices of non-ferrous metals, there is an increase in the selling price of Philippine refractory chrome. The new prices per ton, inclusive of carriage charges, are: direct *ex*-ship, £8 11s. 6d. (£8 5s.); *ex*-store, £9 8s. (£9 1s. 6d.).

Private Imports of Manilla Copal

The Board of Trade announces that all Government stocks of Manilla copal have now been sold, and traders are no longer required to take two tons of Government stock for each ton privately imported. Import licences continue to be issued by the Import Licensing Department.

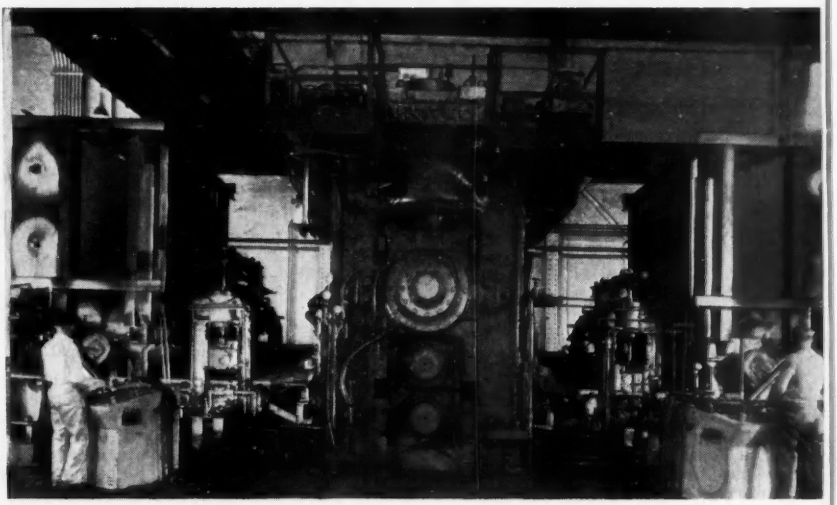
U.S. Advance in Sheet and Strip Steel Processes

IN virtually every country capable of producing or acquiring the large and costly equipment, the post-war trend has been to provide means for a great increase in sheet and strip steels, which are in request by a continually widening range of fabricating industries. The latest response in the U.S.A. to that demand is the new sheet and strip mill lately put into production at the Midland, Pennsylvania, works of the Crucible Steel Company of America, two departments of which, showing the advanced high-speed principles, are depicted here. The whole cost the equivalent of £4.5 million (prior to devaluation).



The 54-in. multiple slitting line, part of the new Crucible equipment, includes an uncoiler, a leveller, a 60-in. shearing knife and (foreground) the rotary slitter, using four 15½-in. knives

Below: Flanked by gas-heated chambers for the steel rolls, this reversing mill hot finishes strip and sheet from 15 to 50-in. wide and, in about five movements, provides reductions ranging from 1 in. to .0076 in.



Separation of Arsenic and Antimony

Technical Methods in Several Countries

by WALTER WENDT, Dipl.Ing.

MARKETABLE antimony metal may not contain more than 0.3 per cent arsenic and the percentage of arsenic usually stipulated is 0.1. The lower the percentage of arsenic in the metal the more readily can the latter be sold. That explains the necessity of removing the arsenic most antimony ores contain in a greater or lesser degree.

Antimony production in South Africa was comparatively insignificant as late as 1938, but by 1944 the Union had become the leading producer in the British Commonwealth and was third in the list of world producers. The sales value of South Africa's antimony production in 1947 was £322,045, and reserves are sufficient to meet demands for many years to come.—"Commonwealth Survey," No. 29

Because of its importance, the problem of separating arsenic from antimony and its technical possibilities deserve close attention.

Several technical methods are known and some of them are in practical use.[1]

1. Differential flotation.
2. Removal of arsenic from metal by caustic soda.
3. Removal of arsenic from oxide and concentrate by volatilisation.
4. Elimination of arsenic in an electric filter plant.
5. Removal of arsenic from oxide by caustic soda.
6. Antimony refining by electrolysis.
7. Special processes

Differential Flotation

Low-grade antimony ores are enriched by flotation. These generally are the ores in which the percentage of arsenic is comparatively high. There are obvious advantages therefore in eliminating the arsenic by differential flotation immediately after mining the ore.

Putting this idea into execution the Antimónové banícke a hutnícke závody, úc. spol., Banská Bystrica, Slovensko, erected in 1931 a flotation plant for the selective flotation of gold bearing antimony ores, built by the firm Krupp Grusonwerk, Magdeburg.[2, 3, 4]

In this case the separation of arsenic pyrites, which contain the gold, from antimony trisulphide has to be carried out. At first, the flotation takes place in an alkaline medium using pine-oil and butylxanthate to obtain the arsenic-gold concentrate. Then the work is continued in acid pulp with creosote phosphate (*phosokresol*) and butylxanthate to obtain the antimony concentrate.

Chemical Agents

The amounts of required agents at the differential flotation applied to 1 ton of feed are as follows:—

220-300 g. alkali
15-30 g. pine oil
50-60 g. *phosokresol*
140-350 g. butylxanthate
6000-9000 g. sulphuric acid

At a flotation feed of a minimum percentage of 7 per cent antimony in the form of sulphide and at least 11 g/t. gold as well as a maximum of 0.35 per cent arsenic the following guarantees were given by Krupp Grusonwerk:

a extraction of antimony concentrate with a minimum percentage of 60 per cent antimony, maximum percentage of arsenic 0.3 per cent.

b a yielding of 80 per cent of antimony contained in the flotation feed as antimony concentrate and gold concentrate.

c a yield of 75 per cent of the gold contained in the flotation feed containing in the antimony and gold concentrate.

d enrichment of the gold content in the gold concentrate with at least 200 g/t.

The average analyses of concentrates, derived over many years, were these:—

antimony concentrate		*gold concentrate*	
Sb	60%	Sb	15-20%
As	0.6%	As	8-14%
Au	25-40 g/t.	Au	200-250 g/t.
S	25%		
Pb	0.7%		

So it was possible to discharge the bulk of the arsenic in a separate concentrate. The so-called gold concentrate which contains most of the arsenic was at the same time enriched with gold. The antimony was enriched to 60 per cent.

Later, the differential flotation was abandoned and the ore was collectively floated, that is, as a mixed concentrate. This was not the result of a failure of the differential flotation but of technical considerations.

At Wiluna, in Western Australia, the differential flotation was also used for separation of antimony from arsenic- and iron-pyrites. But there at first a collective concentrate was treated and from this was separated an antimony concentrate of 60 per cent by depressing the arsenic- and iron-pyrites.

The separation of quicksilver, antimony and arsenic by differential flotation is studied by Tschumarov and Gontscharowa.[5] They show that sodium sulphide is an activator for arsenic pyrites, while it works as a depresser for antimony. Butylxanthate is used as a collector of arsenic in this case.

Removal from Metal by Caustic Soda

Working up collective concentrates as well as other products containing antimony by the roast-reduction process produces antimony containing impurities, chiefly arsenic.

The removal of arsenic is secured by smelting the antimony again in a refining furnace, treating it with caustic soda in an oxidised atmosphere.

A refining furnace of the type described here has proved effective.

The furnace is built of chamotte bricks with oil heating to provide quicker smelting. With a superficial bath area of 1 × 2 m., and a depth of 70 cm. the capacity is about 10 tons. Magnesite tiles are fitted where the walls of the bath come in contact with the caustic soda. To guarantee their durability the magnesite bricks must be well set, preferably with the use of sulphate of magnesia.

The process is this: After removing the iron by treating the molten metal with lump ore, the caustic soda is added to the bath in small lumps. The total amount of caustic soda in kg. required for a refining furnace of 10 tons capacity is determined by multiplying the percentage of arsenic in the antimony by 400. The total is added as 200 kg. quantities of caustic soda.

After the fusion of the first 200 kg., air is blown through the molten antimony bath by submerged tubes. This brings about full contact between the metal, caustic soda and air, and promotes oxidation. The resulting slag is removed and the next lot of 200 kg. caustic soda is added and the aeration is repeated. The completion of the removal of arsenic may be observed by the appearance of the slag but will be proved by analysis. A low percentage of arsenic results in a very thin liquid slag, so that in some cases clay has to be added to make the complete removal possible.

In this refining process a percentage of 0.1 of arsenic in the refined antimony is obtainable.

The slag holds 18 per cent of arsenic in the form of sodium arsenate and 13 per cent of antimony, as sodium antimonate.

This process of removal of arsenic from the metal has the disadvantage that the arsenic is not obtained until the last stage. This is undesirable in many ways and there are good grounds for striving to remove the arsenic during the production of oxide or immediately after. The literature gives some help.

Liddell[4] states that, after covering the molten antimony bath with soda ash, air is blown into the bath. In three successive operations, each of 2 hours' duration, the percentage of arsenic may be lowered from 1 per cent to 0.1 per cent. For each operation 2.5 per cent of the charge weight of soda-ash is required. The soda-ash in the resulting slag can be regenerated by a simple process.

The same author describes a further method of removing the arsenic by smelting broken-up metal with about 5 per cent of nitre and 5 per cent of soda-ash.

The method of oxidation of arsenic in a molten metal bath by blowing air into it in the presence of alkali is also treated by Merson, Krol and Krein[6] and regarded very favourably.

According to publications by the U.S. Bureau of Mines[7, 8], the percentage of arsenic was lowered from 2.22 per cent to 0.012 per cent in 15 minutes in a succession of experiments. They worked with a combination of equal parts of caustic soda, salt, nitre, and soda-ash using 35-40 per cent of the metal's weight of this mixture. Nitre or an oxidising agent of equal value is essential.

Removal by Volatilisation

Corresponding experiments on a large scale by the author to purify antimony oxide containing arsenic by volatilisation were performed in a round furnace. They did not lead to satisfying results.

Liddell[4] states that arsenic oxide volatilises when mixed oxide is heated above 200°C. in a muffle furnace, while antimony oxide remains either as antimony trioxide or as antimony tetroxide.

According to similar experiments performed by C. C. Chao in the laboratory

of the National Bureau of Mining and Metallurgical Research, China, the percentage of arsenic was lowered from 2.38 per cent to 1.55 per cent at a temperature of about 300° C. By treatment of such arsenic containing antimony oxide with hot water and hydrochloric acid for 4 to 5 hours the percentage of arsenic is said to be reduced from 2.38 per cent to 0.54 per cent.

To shed light on the practice of removing arsenic from concentrate by roasting, the author experimented on a large scale. The result was a satisfying removal of arsenic by the fractional roasting of the concentrate in a rotary kiln at 500°C.

To the same end a series of roasting-experiments were carried out effected on a smaller scale by the Bureau of Mines.[7] A small iron revolving furnace with an electric resistance heating was used. During the roasting, air or steam was blown through the furnace. The experiments were performed at a temperature of 300°-600°C. They showed that below 500°C. little arsenic evaporated—to 13 per cent, at 500°C. 61.60 per cent arsenic and 25.88 per cent antimony evaporated. Above 500°C. the loss of antimony was too high—about 60 per cent. The use of steam instead of air at the favourable temperature of 500°C. is of great advantage.

This treatment gives a good elimination of arsenic—73.93 per cent—and the loss of antimony, 10.76 per cent, is not too high. In a further publication of the Bureau of Mines[8] treating with the same experiment, the arsenic elimination is stated to have been 88 per cent and the volatilising of antimony 10-15 per cent.

Hence it is possible to remove a considerable amount of arsenic by roasting the concentrate at 500°C., blowing steam through the furnace.

Recovery from Fumes and Gas

An electric filter plant could also be used for separating antimony oxide from arsenic oxide in the roasting fumes. The fumes obtained, for example, by roasting a collective concentrate in the oxide furnace are conducted without losses of heat in an electric filter plant. The antimony oxide, as dust in the fume, is precipitated, while the arsenic oxide, which is gaseous at this high temperature, goes through the electric filter plant and could be recovered in a bag filter after cooling.

Arsenic trioxide volatises without melting and begins to condense at 218°C. Antimony oxide has a smelting point of 656°C. and is stable between 360°-370°C.

This process was worked out when it was necessary to work up a concentrate with a low antimony percentage (35 per cent), a high arsenic percentage (8 per cent), and a suitable content of gold (30 g/t.).

The usual method of oxide production is based on the roasting of concentrates in the oxide furnace. This process was not practicable in this case because the smallest amount of antimony necessary, 40 per cent antimony content, was not reached.

In concentrates with such a high precentage of precious metals there are losses in the fumes of gold and silver. For this reason the turbulent process in the oxide furnace was replaced by roasting in the rotary kiln.

Recovery from Oxide

Experience with the rotary kiln showed that 60 per cent of the arsenic in the form of arsenic oxide volatilised, but only 25 per cent of antimony did so. The mixed oxide recovered in the filter chamber had a composition of 25 per cent arsenic and 40 per cent antimony. The oxidised material from the rotary kiln, containing the precious metals was treated in the blast furnace to recover gold and silver.

One of the basic problems was how to work up the mixed oxide. A material obtained by other processes in a comparable composition was reduced in a reverberatory furnace with a larger amount of soda-ash and charcoal. Under a cover of salt a yield with 13 per cent arsenic was produced.

Treating the mixed oxide with a hot solution of caustic soda leaves the antimony oxide unchanged and the arsenic oxide is converted into arsenite of soda. After filtration the arsenite of soda is treated with lime of chlorine in order to convert it into arsenate of calcium.

The fractional roasting of the concentrate in the rotary kiln at a lower temperature shows that the greater part of arsenic is volatilised with loss of only a small amount of antimony. Lixivation of the mixed oxide makes possible a total separation of arsenic from antimony. Antimony resting in the oxidised concentrate is by the following precious metal work necessary as collector.

In the most direct way, the ore is treated with a solvent and the solution electrolysed with an insoluble anode. Antimony and arsenic will be deposited together on the cathode.

In practice, the impure antimony metal obtained by a smelting operation is cast into anodes and these are electrolysed as soluble anodes, using a bath of sulphuric

(continued overleaf)

Copper-Chromium Oxide Catalysts

Trend of Recent Italian Research

RECENT work at the Institute of Industrial Chemistry, University of Padua (Italy), on the use of hydrogenation catalysts of copper-chromium oxide, has been described by A. Scipioni (*La Chim. et l'Ind.* 1949, *31*, 8, 277-280). Earlier work in this field, in the U.S.A., has been mainly that of H. Adkins, to which lengthy reference is made. Other contributions also are reviewed.

The present author has found that the usual treatment with acetic acid after thermal decomposition does not always have the desired effect of improved activity, unless barium, strontium, calcium, or magnesium are also present. These additions had already been proposed by Adkins.

But account must, of course, be taken of the particular mode of preparing the catalyst, of which several have been tried. No previous investigator appears to have studied the effect of varying the ratio $CuO : Cr_2O_3$, to which Scipioni now directs attention.

Tabulated results in the hydrogenation of furfurol, using catalysts of Cr_2O_3 content ranging from zero to 86 per cent, show that maximum activity is attained with chromium oxide content of 36.5 per cent, or roughly a ratio of copper to chromium oxide of between 4:1 and 3.5:1 (molar).

The effect of various factors, temperature, pressure, acidity, etc., is discussed. Pressures above 50 atmospheres are usually not necessary or helpful. The time required to reach the required autoclave conditions, e.g., temperature, after contacting catalyst and furfurol, varied according to conditions from 20 min. to 5 hrs. in one series of tests.

An important condition for maximum activity of catalyst is the absence of excess acidity or alkalinity, and therefore strict *p*H control is essential. For reducing acidity various proposals have been made, such as the use of calcium hydroxide; but according to tabulated results with several additives (alkaline) barium hydroxide appeared somewhat better than calcium hydroxide. NaOH was practically useless. The presence of water was found to be markedly effective in reducing activity, even when present in very small percentages.

SEPARATION OF ARSENIC AND ANTIMONY

(*continued from previous page*)

acid containing antimony fluoride in solution, and a small amount of free hydrofluoric acid. A separation of lead and precious metals from the antimony will be obtained, and arsenic deposits with the cathode metal. Arsenic must be separated from antimony either before the electrolytic deposition or after it, using a refining smelter process.

Experiments to refine gold-bearing antimony metal with differing amounts of arsenic by electrolytic methods, made by the Bureau of Mines[9, 10] showed that it is not possible to secure an antimony cathode free of arsenic. The electrolytic methods could not be used for the removal of arsenic.

In a Russian patent (57,555, A. A. Bagdassarjanz, D. J. Repkin and A. K. Schtockerbakow; 15.5.1938) impure antimony metal is refined by smelting the antimony ore with aluminium chips, treating the molten metal several times with NH_4Cl to remove arsenic.

The Russian patent (59,292, G. A. Mejersson, L. J. Krol, C. E. Krein and S. F. Ssolowjew; 16.11.1939) treats molten impure antimony metal at 850°-1050°C. with heated air at the rate of 0.2—0.6 litre/minute for each kg. metal, to drive off the impurities.[12]

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MODERN WELDING TECHNOLOGY

Application to Various Metals and their Alloys

A NUMBER of examples of the application of welding technique to a variety of metals and their alloys are given in reports appearing in the current issue of the "Welding Research" supplement to the transactions of the Institute of Welding.

One of these, on "Gas Welds in Aluminium-Magnesium Alloy Sheet," is presented by Mr. J. Pendleton, now with the Ministry of Supply and formerly investigator to the British Non-Ferrous Metals Research Association, in whose laboratories the work was carried out for the British Welding Research Association. In this report the wrought aluminium-magnesium alloys containing up to 7 per cent magnesium are stated to show promise as high strength weldable alloys, but have not been used to the extent which might be expected due to the development of internal porosity in the basis metal adjacent to a weld bead. The degree of such porosity increases with increasing magnesium content and decreasing welding speed.

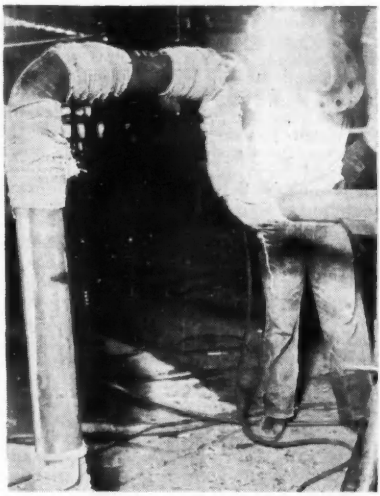
The mechanism responsible for this porosity is reaction between the metal and water vapour forming atomic hydrogen, some of which diffuses into the metal to be rejected as molecular hydrogen at suitable interfaces. The extent of porosity is markedly affected by factors tending to increase the hydrogen content of the metal, notably the presence of minor impurities, calcium in particular.

With Magnesium Alloy

Laboratory-produced 7 per cent magnesium alloy sheet, of low calcium and hydrogen content, was welded without developing internal porosity, and the mechanical properties of the welds were consistently good, e.g., welding efficiencies ranged from virtually 100 per cent (18 s.w.g. sheet) to at least 80 per cent (10 s.w.g. sheet), tested with the excess weld metal machined away.

Cracking experienced in welds in an alloy of 2½ per cent magnesium was avoided by using filler rods containing 5 or 7 per cent magnesium.

Another report, on "An Evaluation of the Resistance Welding of Tin and Tin-Zinc Alloy Coated Mild Steel Sheet," by A. J. Hipperson and P. M. Teanby, was prepared as a result of experimental work done by the British Welding Research Association, sponsored by the Tin Research Institute.



Marked progress has lately been made in the U.S.A. in the use of welding in the employment of large diameter chrome pipe. A typical operation on 6-in. pipe is shown here

The application of resistance welding processes to the fabrication of light engineering assemblies is stated often to involve the problem of welding steel sheet which has previously been provided with thin electrolytically deposited metallic coatings. These coatings are intended either for protective purposes, or for the purpose of obtaining a good bond with paint which is subsequently applied, or both.

It has been found in the past that the presence of certain metallic coatings on the surface of mild steel sheet tends to impair its resistance weldability. The major difficulties introduced are twofold, *viz.*, contamination of the resistance welding electrodes with the coating material, and lack of contact resistance at the points were it is intended to produce resistance welds.

No difficulty was encountered in flash

welding any of the coated steels in the present work, and the properties of the butt joints were comparable with those obtained in uncoated sheet.

The production of spot welds in tin and tin-zinc alloy coated sheet was found to be quite practicable, but closer attention had to be given to the selection of welding machine settings and to electrode maintenance than is necessary with uncoated sheet. Tin-zinc alloy coatings were found to be better suited to spot welding than plain tin coatings.

With plain tin coating, electrode life was much shorter, and adhesion of the electrode tips to the surface of the stock presented some difficulty. The presence of zinc in the coating appeared to improve weldability considerably, compared with plain tin coating.

The use of fully automatic welding machines is desirable for welding coated steels, because the success which can be obtained with the process depends largely upon the use of accurately controlled machine settings.

Steel Company's Expansion

IT is announced by Dorman Long & Co., Ltd., that the second stage of its large-scale development plan, involving expenditure of £8 million, is to be put in hand at once. The company's projects include the handling of an open hearth steel plant at Lackenby with a capacity of 10,000 ingot tons a week, extension of its new ore grading plant at the Cleveland works, and the installation of new blast furnace ancillary equipment. It is hoped to complete this work in three years, and it is expected that about 60 per cent of it will be undertaken by the company's own engineering departments and by its subsidiaries.

The first part of the development scheme, costing £2.25 million, included the installation of central ore unloading equipment and ore preparation plant at the Cleveland works, and the construction of a private railway linking the Cleveland and Redcar works.

Mining Scholarships

The National Coal Board has published the names of 37 successful schoolboy candidates for university scholarships in mining engineering and allied subjects. Awards to 54 young miners, ranging in age from 17 to 33 years, were published several months ago. The value of the scholarships may be as much as £500 a year, depending upon the university attended.

HARD STAINLESS STEEL

Claims for New U.S. Process

BY a combination of extreme heat treatment and the deep-freeze principle an American company, the Robeson Cutlery Company, Perry, New York, claims to have overcome the comparative softness of stainless steel of the type used for cutlery and similar purposes. Knives made by the process are claimed to hold their keenness for three years and to be more resistant than conventional carbon steel.

Discussing the process, for which patent application has been made, Mr. Emerson E. Case, president of the company and originator of the method, states that tests and analyses so far indicate practically no difference in the composition or chemical characteristics of steel produced by the process and steel hardened by conventional methods. Tested on a standard Rockwell hardness testing machine, the new steel may show a hardness substantially the same as steel made by other processes.

Knife blades are first heated to a temperature much higher than that normally employed for this process. The blades are then bathed in quenching oil, according to the usual process, at a temperature of 104° F. Then they are placed in a specially-constructed deep freeze chamber at sub-zero temperatures.

After a suitable period of freezing, they are again heated, to relieve the usual stresses and strains. The blades are allowed to cool gradually to room temperature. Finally, they are tempered in the conventional manner to the desired degree of hardness.

Flintshire Lead Survey

NEW reserves of lead may be opened up by prospecting in progress at Halkyn, Flintshire. Operations at the Halkyn lead mine, one of the three largest in Britain, were suspended in 1941 because most of the ore was exhausted. Other veins are known to exist and a survey is to determine their extent. The Flintshire and Denbughshire lead mines have produced 650,000 tons of lead concentrates in the last 100 years, and until recently were third in the production table for the country. According to the Mineral Development Committee, " it is generally agreed that further development at Halkyn holds promise."

Britain's lead and zinc production has dropped from 40,000 tons a year in the 1930's to about 3,000 tons.

Next Week's Events

MONDAY, OCTOBER 3

The Royal Institute of Chemistry

London: London School of Hygiene and Tropical Medicine, Keppel Street, W.C., 6.30 p.m. (Joint meeting with SCI). J. Grant: "Pulp and Paper Manufacture as a Chemical Industry."

Institute of Metals

Paris: Maison de la Chimie, 28, Rue St. Dominique. 41st annual autumn meeting by invitation of the Société Français de Métallurgie and the French Non-Ferrous Metal Industries. Discussions, visits, etc. (until October 12).

TUESDAY, OCTOBER 4

Electrodepositors' Technical Society

Birmingham: Grand Hotel (morning) and James Watt Memorial Institute (afternoon). Symposium on "The Influence of the Surface Condition of Metals on Electrodeposits."

Incorporated Plant Engineers

Cardiff: Grand Hotel, 7.30 p.m. (South Wales Branch). "Pumping Machinery," by a representative of Pulsometer Engineering Co.

WEDNESDAY, OCTOBER 5

Institute of Packaging

Manchester: City Hall, Deansgate. 1st National Packaging Exhibition. Daily (until October 15.)

British Association of Chemists

London: Wellcome Research Institution, Euston Road, N.W.1, 7 p.m. Dr. A. H. Leckie (British Iron and Steel Research Association): "Some Aspects of Research on Iron and Steel Production Plant."

Society of Public Analysts and other Analytical Chemists

London: The Chemical Society, Burling House, Piccadilly, W.1, 6.45 p.m. J. Straub (Municipal Laboratory, Amsterdam): "Calculation of the Botanical Composition of Wheat Flours and Offals from the Chemical Analysis" and other papers by D. W. Kent-Jones, A. J. Amos, and W. Martin.

THURSDAY, OCTOBER 6

The Royal Institute of Chemistry

Dagenham: South-East Essex Technical College, Longbridge Road, 6.30 p.m. A. H. Charlton: "Modern Methods of Soap Manufacture."

Department of Scientific and Industrial Research

Glasgow: Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, C.2. 10.30 a.m. One-day conference on "Scottish Needs in Building Research."

Society of Chemical Industry

Birmingham: The University, 6.30 p.m. (Plastics and Polymer Group). Prof. H. W. Melville (University of Birmingham): "Copolymerisation and Related Phenomena."

Oil and Colour Chemists' Association

London: Royal Institution, Albemarle Street, W.1, 6.30 p.m. Professor M. G. Evans: "The Design of Experiment." First of three post-graduate lectures.

FRIDAY, OCTOBER 7

Incorporated Sales Managers' Association

Gleneagles, Perthshire: Gleneagles Hotel. 14th annual conference (until October 10). Discussion: "Sales Management—A Way of Reconciling the Welfare of the workers with the Changing Pattern of Consumer Demand."

Society of Public Analysts and Other Analytical Chemists

Sheffield: The University. 22nd ordinary meeting of the Physical Methods Group. Joint meeting with the RIC and Sheffield University Chemical Society organised by the Polarographic Discussion Panel. The meeting will be preceded by a visit to Bragg Laboratory, Naval Ordnance Inspection Department.

Royal Society for Prevention of Accidents

Scarborough: Royal Hotel. Chemical Safety Conference, organised on behalf of the ABCM (until October 9).

Photoelectric Spectrometry Group

London: Institution of Electrical Engineers, Savoy Place, Victoria Embankment, W.C.2, 2.30 p.m. Annual general meeting. Dr. Marcel J. E. Golay (Signal Corps Engineering Laboratories, New Jersey, U.S.A.): "The Pneumatic Infra-Red Detector," and "Multi-Split Spectrometry."

Institution of Chemical Engineers

Manchester: College of Technology, 3 p.m. (North-Western Branch). Dr. S. B. Cormack: "Special Features in the Design, Construction and Operation of Plant for the Manufacture of Toxic Substances."

Technical Publications

A GREAT advance in solving the problem of providing satisfactory protection and decoration for ferrous metals subjected to extreme heat is claimed by the Atlas Preservative Co., Ltd., for its new aluminium paint No. 2845. The paint will withstand a temperature of 600° C. without damage to the paint film or loss of adhesion, and also has excellent weathering properties.

* * *

PROBLEMS of dust, wear due to heavy traffic, and attack by acids and oils on flooring have always to be borne in mind in industrial chemistry. A new surface treatment, "Isolament," which increases wear and resistance to chemical attack has been devised by Guaranteed Sanitation, Ltd., Islington, N.1.

* * *

AN aid to keeping up to date with the increasing number of standards is issued by the British Standards Institution in the form of revised sectional lists. PD.945 (August, 1949), covers revisions and additions to paints, varnishes, etc.

* * *

VARIABLE speed control units suitable for the chemical industry are described in the latest leaflet available from Sentinel (Shrewsbury) Ltd., Shrewsbury, England. The F.U. variable speed units described are manufactured in six sizes under licence from the French company Soc. Fabrications Unicorn.

THE treatment of grey cast iron by introduction of magnesium to produce castings containing graphite in spheroidal form is described by W. W. Braidwood and A. D. Busby in the *Nickel Bulletin* (August-September, 22, 126-130) published by the Mond Nickel Co., Ltd.

* * *

NEW designs in polythene containers suitable for users of corrosive liquids are announced by Tenaplas, Ltd., Upper Basildon, Berkshire. Features of the new types are original spout positioning, lightness of weight, and the extremely smooth interior resulting from the method of manufacture from extruded tubing. Buckets are made in two sizes, 1¼ and 2¼ gallons, and cans in five sizes, from 16 oz. to 1 gallon capacity.

* * *

A STEEL band conveyor that floats on a coolant is an ingenious plant development patented by the Steel Band Conveyor and Engineering Co., Ltd. Selly Oak, Birmingham. The water-bed conveyor carries the product on a solid steel band supported on water which is circulating, thus enabling material to be cooled and conveyed at the same time. The installation saves floor space, and reduces labour and cooling time. It is suitable for cooling gelatin, pitch, sulphur, grease, synthetic resin, metasilicate of soda and many other materials.

New Source of Chemical Plant and Appliances

Chemical and pharmaceutical machinery for a large range of tablet machines and automatic water stills is housed in the modern works newly occupied by Manesty Machines, Ltd., Speke, Liverpool. Ancillary equipment made here are granulators, coating pans, cone mills and drying ovens

ATOMIC EXPERTS HERE

Three Nations Confer on Sources

REPRESENTATIVES of the United Kingdom, Canada and the United States are attending a technical conference in London this week on problems of locating, mining and processing radioactive ores. The delegates will discuss exploration techniques, and analytical and extraction methods relating to radioactive ores.

The United Kingdom representatives will include Mr. M. W. Perrin, (deputy controller of production, Atomic Energy Division, Ministry of Supply); Prof. R. P. Linstead (ex director, Chemical Research Laboratory); Dr. W. F. P. McLintock and Dr. C. F. Davidson (Geological Survey of Great Britain); Mr. F. H. Burstall and Mr. T. V Arden (Chemical Research Laboratory); and Dr. R. Spence, Mr. G. S. White and Dr. D. Taylor (Atomic Energy Research Establishment, Harwell).

The Canadian delegation comprises Mr G. C. Bateman, Mr. A. H. Ross and Mr. R. H. Farmer; Dr. A. H. Lang and Mr. George Shaw; Dr. E. A. Brown and Mr. A. Thunaes; Mr. H. B. McGuffie and Mr. R. E. Manson.

The U.S. delegates will be Dr. C. K. Leith, Mr. T. F. Field, Mr. Evan F. Wilson and Dr D. L. Everhart; Dr. T. F. Nolan, Mr. J. C. Rabbitt and Mr. A. P. Butler, Junr.: Dr. A. M. Gaudin; and Messrs. B. D. Thomas, G. H. Cewett and W. Hirschkind.

Defining Radiation Risks

A THREE-power conference on radiation tolerances—the amount of radio-activity which human beings and animals may safely receive over specified periods—was held at the Canadian Atomic Energy Establishment, Chalk River, Ontario, on Thursday and Friday this week.

One of the primary purposes was to hold discussions leading to the establishment in Britain, Canada and the U.S.A. of uniform radiation tolerance standards between the atomic energy projects of the three nations.

The British delegation consists of Prof. J. S. Mitchell (Department of Radiotherapeutics, Cambridge University), Dr. G. J. Neary (Medical Research Council Radiobiological Unit, Harwell), Mr. A. C. Chamberlain (the Atomic Energy Research Establishment, Harwell) and Dr. E. F. Sdson (Principal Medical Officer at the Atomic Energy Production Factory, Springfields).

BRITISH SCIENTISTS IN U.S.A.

To Study U.S. Production Methods

NAMES of the first eight British scientists and technologists who will receive advanced technological training and practical instruction in American production methods under the technical assistance programme of the Economic Co-operation Administration were announced last week.

The scheme is designed to help to increase European production and efficiency, and a total of 50 scientists will be selected by the British Government. The remaining members of the group are expected to reach the U.S.A. early next spring.

The first party will be composed as follows:—

Mr. William Barnes, Feniscliffe, Blackburn, Lancs. (Cornell University, Ithaca, N.Y.—production engineering); Mr. William Eric Dennis, Kettering, Northants (Carnegie School of Technology, Pittsburgh, Pa.—physical chemistry of steel making); Mr. Malcolm Adam Gullen, Willowbrae, Edinburgh (Purdue University, Lafayette, Indiana—electronics); Mr. Gerald Houghton, London (Ohio State University, Columbus, Ohio—chemical engineering).

Mr. Harold William Paxton, Moss Side, Manchester (Carnegie School of Technology, Pittsburgh, Pa.—metallurgy); Mr. Douglas Willie Riley, Sheffield (California Institute of Technology, Pasadena, Calif.—chemical engineering in stable isotopes); Mr. Colin Greenwood Weir, Edinburgh (Illinois Institute of Technology, Chicago, Ill.—electric power transmission); Mr. Peter Wilfred Dunn, Farnham, Surrey (Purdue University, Lafayette, Ind.—production and industrial engineering).

U.S.-British Scientific Liaison

TWO United States scientists of distinction, PROF. GORDON FERRIE HULL, JR., of Dartmouth University, and LYNN S. BEEDLE, of Lehigh University, are coming to London Shortly to investigate physics and metallurgical research carried on in Great Britain and on the Continent.

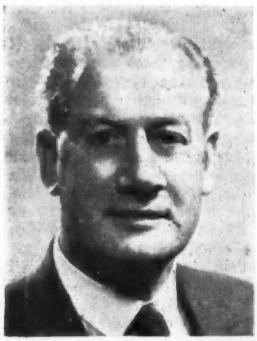
Prof. Hull, a member of the Dartmouth physics department since November, 1944, is to serve as physicist for the U.S. Office of Naval Research and will have his headquarters in the U.S. Embassy in London. He will deliver a series of lectures on various aspects of research which he has been conducting. The second scientist, Lynn S. Beedle, research engineer for the department of civil engineering at Lehigh University has been granted leave of absence to accept an invitation from Cambridge University to co-ordinate liaison on studies being made at the two universities on the strength of welded steel frames and their components.

· PERSONAL ·

LAPORTE Chemicals, Ltd., announced this week that MR. P. D. O'BRIEN and MR. B. E. A. VIGERS, directors, have been appointed assistant managing directors; MR. W. J. PIGGOTT, director and secretary, has voluntarily reliquished his appointment as secretary, which he had held for 27 years. MR. H. E. FARMER is the new secretary of the company.

DR. WILLIAM F. HESTER, formerly director of insecticide and fungicide research at the Rohm and Haas Co., Philadelphia, Pa., has been appointed administrator of the 18 fellowships of Koppers Co., Inc., at the Mellon Institute of Industrial Research, University of Pittsburgh. The doctor will be responsible for the research and development work by the 98 scientific workers and their assistants at the institute.

MR. W. E. CARTWRIGHT has been appointed secretary to the National Benzole Association in succession to Mr. P. G. Somerville. Mr. Cartwright has long been connected with the benzol industry. In 1919 he joined Strakers & Love, Ltd., as chemist at its Brancepeth coke works. Nine years later he was appointed installation chemist to the Newcastle Benzol Co., retaining his position when it was acquired by the National Benzole Co. the following year. In 1935 Mr. Cartwright became control chemist at the Willesden laboratories, and four years after was transferred to head office as technical adviser.



Mr. W. E. Cartwright

Mr. H. M. Garner, newly appointed chief scientist to the Ministry of Supply

MR. ARTHUR COCHRANE has been appointed chairman of H. J. Elliott, Ltd., makers of E-Mil laboratory glassware and thermometers, at Treforest Trading Estate, Nr. Pontypridd, Glamorgan. Mr. Cochrane is assistant managing director of the Triplex Safety Glass Co., and subsidiary companies, including Quickfit & Quartz, Ltd., manufacturers of scientific glass apparatus and industrial glass plant.

SIR REGINALD STRADLING has been appointed Dean of the Military College of Science, in succession to the late Professor C. H. Lander. Sir Reginald Stradling was chief adviser on research and experiments for the Ministry of Home Security during the war.

DR. F. RIESENFELD has terminated his appointment with Catalia, Ltd., of Waltham Abbey, Essex, of which he was a director. He had been technical manager since 1936.

Obituary

EX-BAILIE ALEXANDER KENNEDY, who founded the firm of Kennedy and Reid, Parkhead Oil Works, Glasgow, of which he was sole partner when he gave up business at the beginning of the war, has died at his home, Kenmill, Bothwell. He was 96. He was a member of Glasgow Town Council for many years and was senior magistrate for five years.

HOME

Stewarts and Lloyds' Extending

The Rutherglen Dean of Guild Court has granted permission to Stewarts and Lloyds, Ltd., Glasgow, to erect buildings estimated to cost £138,000, in Dalmarnock Road, Rutherglen, for the production of steel fittings. Employment will be provided for 200.

Machinery Rehabilitation

Fescol, Ltd., has opened at Port Glasgow a new factory, which is the first plant of its type in Scotland, for the rehabilitation of engineering parts by coating them with a resistant nickel or chromium surface. The process has been particularly successful on turbine gears, hydraulic rams, steel mill rollers, automobile parts and turbine blades.

Chemistry's Aid to Textiles

Application of various chemicals to the textile industry to improve the quality of yarn, for ensuring thorough wetting of fibres under acid conditions, and as an efficient mildew preventative in felts and yarns, will be demonstrated by Monsanto Chemicals at the Textile Machinery and Accessories Exhibition to be held at Belle Vue, Manchester, next month.

Borax and Boric Acid Prices

Increased prices for all grades of borax and boric acid, provisionally to take effect from October 22, are notified by Borax & Chemicals, Ltd. The new levels, per ton in ton lots, carriage paid, include: Borax; anhydrous, £59 10s. (present price £46); commercial granular, £36 (£27); powder, £39 (£30); extra fine powder, £40 (£31). Boric acid; commercial granular, £64 10s. (£48); powder, £67 10s. (£51-£53); extra fine powder, £69 10s. (£53).

Producing for Dollar Markets

The Incorporated Sales Managers' Association announces that National Sales Executives (an American association) has accepted an invitation to hold, in London next February, a joint conference on techniques of distribution. Sales managers here believe that the attempt to double the sales of British goods in U.S.A. cannot succeed until many sections of industry are prepared to relate their production planning to the requirements of dollar markets. It is noted that the Anglo-American Productivity Council has no sales member. All organisations interested in the sale of British goods in dollar markets will be invited to participate in the conference.

Spanish Trade Prospects

Belief that an important market existed in Spain for Scottish goods and that Spain and Scotland could trade with benefit has been expressed by Lord Provost Victor Warren, of Glasgow. Spain needed British chemicals, fertilisers, machinery and rubber, he told the Rotary Club last week, while in return she could send fruit, wheat and oil.

Increased Distilling

Highland Distilleries Co., Ltd. are to reopen Speyside distilleries for the season immediately and expect to work continuously until June. Scottish malt distillers put many of their distilleries into production on September 25. According to the Scotch Whisky Association production this year will reach some nine million gals. in the Highlands area, while the total Scottish prospect, based on the available grain, is estimated at 30 million gal.

New Penicillin

Three new penicillin preparations are being introduced by Glaxo Laboratories, Ltd., Greenford, Middlesex, with effect from October 3. These are Prolopen (an oily injection of procaine penicillin G with crystalline sodium penicillin G); crystalline penicillin G ointment Glaxo; and crystalline penicillin G eye ointment Glaxo. It is also announced that prices for the company's penicillin will be decreased from the same date. This is the fifth reduction in less than three years.

German Technologist in Scotland

A German specialist, Herr L. Casagrande, now one of the staff of the building research station at Watford, Herts., is making an important contribution towards preparing for the erection of the big oil refinery sponsored by Scottish Oils, Ltd., at Grangemouth. A report in *The Scotsman* states that Herr Casagrande is applying at Grangemouth the technique, based on electro-osmosis, which he developed in Germany during the war to permit the erection of massive submarine pens in unstable soil. The present objective is to stabilise the sub-soil, no suitable stratum having been located during drilling to below 100 ft., and permit the creation of a "floating" platform on which the foundations of the refinery, on which some £12 million is being spent, can be securely based.

OVERSEAS

New Italian Petroleum Refinery

The petroleum refinery now under construction at Mantua (Italy) is expected to be ready for production during 1950. The new plant will be capable of dealing with 250,000 tons of crude per annum.

Water Power for Uganda

A £3,639,540 contract has been obtained by a group of British firms, including Dorman Long, and Dutch firms, to build the Owen Falls Dam in Uganda, to afford cheap hydro-electric power and form the first part of a 25-year scheme for the fuller cultivation of Egypt.

World's Largest Steel Furnace?

Thought to be the largest in the world, with a 550-ton capacity, a new open-hearth steel furnace has been placed in operation at the Weirton Steel Company, Weirton, West Virginia, a subsidiary of the National Steel Corporation. The furnace, with more than three times the average capacity, was rebuilt from one with a capacity of 200 tons. The furnace turns out low carbon steel, which constitutes the great bulk of annual steel tonnage.

New Colour Pigment for Rubber

Development of a fine silica pigment which will enable both natural and synthetic rubber products to be manufactured in many colours has been announced by the Columbia Chemical Division of the Pittsburgh Plate Glass Co., Pittsburgh, Pennsylvania. The product known as Hi-Sil was developed in the company's research laboratories at Baberton, Ohio, and is claimed to be the first silical pigment to be produced in large quantities at low cost.

Oil Plant for Russia

The United States Department of Commerce is reported to have approved the immediate export to the U.S.S.R. of $500,000 worth of oilfield machinery. New York trade circles state that 40,000 tons of Russian manganese and chrome ores are being shipped to the U.S.A.

Anti-Trust Suit Postponed

The United States Government's anti-trust suit against E. I. du Pont de Nemours & Co., Inc., charging restraint of trade through various agreements with other companies has been postponed at the Government's request until April 3, 1950.

Australia Reviving Whaling Industry

A revival of the whaling industry, which has been in abeyance since 1927, is being undertaken by the Australian Government at Shark Bay, Western Australia. The decision to re-establish the industry was partly due to development of the hydrogenation process to remove the natural odour and taste from whale oil.

Italy's Smaller Chemical Exports

In the first half of 1949, nearly all the chemical exports from Italy showed decreases compared with the corresponding period of 1948. Notable among the few increases was tartaric acid, 8800 tons against 465 tons last year. Caustic soda exports fell to 6298 tons from 32,649 tons. Paints, varnishes and dyes registered 6390 tons against 6600 tons.

Raw Materials for Austria's Chemical Industry

An increasing quantity of raw materials for the chemical industry is reported to have been received by Austria during the last quarter. These were mainly under ERP, but some also under existing trade agreements. Commodities such as crude rubber, phenol and dyestuffs, however, remain in short supply.

U.S Sulphur Production

Production of sulphur in the U.S.A. in June totalled 399,025 long tons, a decrease of 18,501 tons from the previous month. Total for the first six months of 1949 remained at approximately the same level as the corresponding period in 1948—2,383,473 tons against 2,394,509 tons. Apparent sales showed a decrease in the month of June, but for the first half of this year showed no appreciable change over the same period of 1948.

New U.S.-Canadian Company

The Standard Company, Ltd., and General Aniline & Film Corporation, of New York, have jointly formed a Canadian company, Chemical Developments of Canada, Ltd., with $14 million authorised capital to manufacture in Canada organic chemicals based upon the technical and assigned patents of General Aniline & Film Corporation. Many of the proposed products have not previously been produced in Canada. The first to be manufactured will be a group of synthetic non-ionic detergents utilising ethylene oxide as a raw material. The engineering and design of a new plant for this purpose is well advanced.

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary ,but such total may have been reduced.)

MIDLAND PLASTIC & GRANOLITHIC CO., LTD., Birmingham. (M., 1/10/49.) August 18, mortgage, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on 38 Gravelly Hill North, Erdington, Birmingham, with fixtures. *Nil. June 25, 1947.

ZENOLUME, LTD., Harrow, scientific glassware manufacturers. (M., 1/10/49.) August 23, £600 debenture, to G. E. Gladding, Guildford; general charge. *Nil. June 30, 1947.

Satisfactions

PIONEER OIL SEALING & MOULDINGS CO., LTD., Southam, oil sealing engineers. (M.S., 1/10/49.) Satisfactions August 25, £1250 registered December 4, 1946, and £1250 registered August 14, 1947.

Company News

Albright & Wilson Ltd.

An interim dividend of 10 per cent on the ordinary capital for the year ending December 31, 1949, was announced at a recent meeting of the board.

British Glues and Chemicals, Ltd.

At the 29th annual general meeting, consolidated profit was announced as £106,418 (£113,606) of which £92,488 is available for distribution. Net dividends are the same as previous year, amounting to £28,875 on preference stock and £24,062 on ordinary stock; £39,551 is carried forward.

The directors of IMPERIAL CHEMICAL INDUSTRIES, LTD., have declared an interim dividend on the ordinary stock of 3 per cent (actual) for the year ending December 31, 1949. The dividend will be payable on December 1.

Powell Duffryn, Ltd.

A final dividend is recommended of 5 per cent (same) on the £9,660,471 ordinary capital for the year ended March 31, 1949, making, with the interim dividend (paid February 23) 8 per cent for the year. Net profit for 1948-49 is £652,106 (£939,176).

Increases of Capital

The following increases in capital have been announced: JOSEPH MASON & CO., LTD., from £40,000 to £80,000. BURMAH-SHELL OIL STORAGE & DISTRIBUTING CO. OF INDIA, LTD., from £1,000,000 to £4,000,000. SMO-REX, LTD., from £500 to £10,500.

Change of Name

The following change of name has been announced: PEERLESS CHEMICAL LABORATORIES, LTD., to PEERLESS PRECISION PRODUCTS, LTD.

New Registrations

Thanet Moulders, Ltd.

Private company. (473,110.) Capital £1000. Manufacturers and workers of plastic and thermoplastics, phenol, cyanides and cyanogen products; gold extractors, etc. Directors: H. J. Gordon, R. Challenger, J. L. Cuming and R. G. Hughes. Reg. office: 3 Lloyd Road, Broadstairs, Kent.

Aerite, Ltd.

Private company. (473,115.) Capital £2000. Manufacturers of fertilisers, sprays, disinfectants, insecticides. Director. A. Monteith. Reg. office: 95a, Chancery Lane, W.C.2.

E. Law & Sons (Shellac); Ltd.

Private company. (473,134.) Capital £3000. Objects: To acquire the business of a shellac bleacher, dewaxer and refiner carried on by Wm. Law at Usk Street, E.2, as "E. Law & Sons." Directors: W. Law and E. R. Law. Reg. office: 14-16 Usk Street, Bethnal Green, E.2.

Fire at Fisons

Considerable damage was caused by fire on Monday at West Bank Dock stores of Fisons, Ltd., at Widnes, where bales of hessian and paper bags ignited and may prove to be a total loss. It was stated the incident would not interrupt operations.

The Stock and Chemical Markets

SHARE values have lost part of the advance that followed devaluation of the £. More cautious views are prevailing, now that many other countries have also devalued their currencies, and this has led to extremely keen competition for export business to the U.S.. While many British companies have excellent prospects of increasing their dollar income from export trade, with a resultant increase in profits, this would not mean more for shareholders as long as the dividend limitation request remains in force. It is felt in the City that devaluation of the £ will make inevitable before long the easing or dropping of further controls.

Already, tin is decontrolled and the partial reopening of the London Metal Exchange, now projected, may foreshadow the freeing of all metals if Britain's dollar income improves.

Talk of a general election before the end of the year has also enforced caution, because the result would, of course, have considerable effect on long-term developments.

Chemical and allied shares moved back with the general trend in industrials. Imperial Chemical, for instance, reacted to 43s., Turner & Newall to 76s. 10½d., United Molasses to 40s. 6d. and Dunlop Rubber to 63s. The prospect of reopening of the London Metal Exchange stimulated a rise of 3s. 1½d. in Metal Traders to 55s. 7½d., while Amalgamated Metal shares were 1s. up at 19s. 6d.

Higher price of tin caused a drop of 2s. 6d. in Metal Box shares to 98s. 9d. The higher price of copper also led to an easier trend in electrical equipment shares, among which General Electric were 80s. 6d. and Associated Electrical 76s. 9d. Iron and steels reacted on reported reduced demand for steel from industries mainly confined to the home market. United Steel were back to 25s. 9d., although the pending dividend is expected to be maintained, while Stewarts & Lloyds eased to 53s., Dorman Long to 29s. 6d. and Colvilles to 33s. Elsewhere, Babcock and Wilcox came back to 61s. and Allied Iron to 38s. 9d.

Fears that the economy move may mean reduction in building rendered Associated Cement easier at 74s. 3d. and paint shares lost a little ground, Pinchin Johnson being 35s. 3d.

Fisons have changed hands around 28s. 6d., Monsanto were firm at 51s. 10½d. Laporte Chemicals 5s. shares 9s. 6d. " ex " the bonus and Lawes Chemical 10s. 6d., while Major and Co's shares were 2s. 6d. W. J. Bush were marked back to 75s. The 4s. units of the Distillers Co. came back to 27s. 7½d. British Xylonite were lower at 72s. 6d., while De La Rue were 23s. 9d. and British Industrial Plastics 2s. shares 5s. 1½d. British Oxygen eased to 94s. 4½d. in accordance with the prevailing trend and British Aluminium were slightly lower at 43s.

Levers have been steady at 43s. 3d. British Glues and Chemicals 4s. shares at 19s. 6d. lost their recent improvement. Boots Drug eased to 50s. 6d., but Borax Consolidated were firm at 59s. 4½d. Glaxo Laboratories were back to £18¾, following their recent advance. British Drug Houses 5s. shares were 6s. 9d., Sangers easier at 24s. 9d. and Beechams deferred 14s. 9d.

Oils reacted, Shell to 70s. and Trinidad Leaseholds to 26s., while Ultramar were an erratic market. Mexican Eagle rose to 17s. 9d. following news of the capital repayment.

Market Reports

BUSINESS in chemicals generally has been on a fair scale during the past week, most of the routine lines moving steadily into consumption. Export inquiry has been good, but trading conditions show little alteration and prices are mostly unchanged. A notable exception is the higher quotations for the chemical compounds affected by the increase in non-ferrous metal prices. The revised basic price for dry white lead is now £146 per ton (£30 10s. up) and for ground white lead £163 per ton. The revised price for red lead is £138 per ton. The home demand for the coal tar products remains quiet and pitch continues to be in fair request. Some expansion in the export inquiry for phenol and ADF cresylic acid is reported, within a limited price range.

MANCHESTER.—The demand for the non-ferrous metal compounds on the Manchester chemical market during the past week has been adversely affected by the sharp price increases and it is likely to be some weeks before conditions in these sections settle down. There is a good demand for the alkalis and the general run of heavy chemicals. Deliveries of these to the principal consumers during the week have been on a reasonably satisfactory

(*continued at foot of page* 474)

Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Production of fluorine containing hydrocarbon derivatives.—Imperial Chemical Industries, Ltd., A. J. Rudge and A. J. Lowe. March 27 1944. 628,454.

Preparation of organic mercury compounds.—F. J. Sowa. Aug. 5 1943. 628,525.

Oxidation of aliphate hydrocarbons.—A. H. Stevens (Cargill, Inc.). Nov. 27 1944. 628,457.

Electrodeposition of lead-antimony-tin alloys.—A. A. Thornton (Cleveland Graphite Bronze Co.). July 10 1945. 628,459.

Dielectric compositions.—Titanium Alloy Manufacturing Co. April 10 1943. 628,536.

Fire extinguishing systems.—Foamite, Ltd. Oct. 27 1944. 628,738.

Method and apparatus for separating immiscible fluids.—J. R. Howden (Selas Corporation of America). April 23 1946. 628,464.

Coated threads or the like of synthetic linear polyamide resin.—S.p.A. Lavorazione Materie Plastiche. Feb. 25 1943. 628,466.

Moulding plastic materials by extrusion.—S.p.A. Lavorazione Materie Plastiche. April 3 1943. 628,467.

Mixing and compressing of plastic masses.—S.p.A. Lavorazione Materie Plastiche. Feb. 15 1944. 628,468.

Process for preparing a preparation containing salicylanilide. — Nederlandsche Centrale Organisatie Voor Toegepast) Natuurwetenschappelijk Onderzoek. Aug. 22 1945. 628,564.

MARKET REPORTS

(*continued from previous page*)

scale and fresh inquiry and actual business have been in the market. Some sections of the fertiliser trade, including the compounds, have been fairly active. There has been little change in conditions in the tar products market and only a moderate amount of new business has been reported.

GLASGOW.—Business in general has come practically to a standstill since the devaluation of the £, and it appears as if it will be almost another week before trading becomes anything like normal. In the export market, where one would have expected a boom in inquiries, there has been practically no activity.

Manufacture of vat dyestuffs.—Ciba, Ltd. July 27 1945. (Cognate Application 22308/46). 628,566.

Compositions containing cellulose esters and ethers.—British Celanese, Ltd. Sept. 13 1945. 628,477.

Interpolymers of acrylamide and methacrylamide.—General Aniline & Film Corporation. Oct. 16 1945. 628,479.

Process for colouring hydrophobic substances soluble in hydrocarbons.—Ciba, Ltd. Nov. 16 1945. (Cognate Application 31708/46.) 628,598.

Inhibiting the dehydro-halogenation of halogenated organic compounds.—Mathieson Alkali Works. Nov. 27 1945. 628,485.

Process of producing alkali metal chlorites from chlorine dioxide.—Solvay & Cie. Dec. 15 1945. 628,487.

Manufacturing of semi-conducting bodies, consisting of titanium oxide.—E. H. Schaefer. Dec. 10 1946. 628,491.

Apparatus for drying or crystallisation by spraying.—D. d'Ans. Dec. 28 1945. 628,758.

Process for the stabilisation of organic compounds of high molecular weight containing inorganic acid-forming elements.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Sept. 26 1946. 628,622.

Process for the recrystallisation of melamine.—Ciba, Ltd. Feb. 8 1946. (Cognate Application 2135/47 and 2136/47.) 628,631.

Production of aryl-β : 8 -dihydroxypropyl ethers.—British Drug Houses, Ltd., W. Bradley and J. Forrest. Feb. 12 1947. (Cognate Application 2609/48.) 628,497.

Production of organic hydroxy compounds.—Imperial Chemical Industries, Ltd. and J. G. M. Bremner. April 23 1947. 628,503.

Hydrolysis of organic esters.—Soc. Normande de Produits Chimiques. Jan. 29 1946. 628,656.

Synthesis of esters.—E. I. Du Pont de Nemours & Co. and W. F. Gresham. May 7 1947. 628,509.

Synthesis of organic nitrogen compounds.—E. I. Du Pont de Nemours & Co. and W. F. Gresham. May 16 1947. 628,659.

Production of butadiene.—Universal Oil Products Co. Oct. 29 1943. 628,686.

BP Codex Challenged

A RECENT prosecution in Dublin District Court raised the question of admissibility as a standard in Ireland of the British Pharmaceutical Codex. The case was adjourned until October 12. It was brought by Dublin Corporation against Samuel T. Smith, a chemist, who was alleged to have sold a jar of chilli paste which was not of the nature, substance and quality of the article demanded.

The defence objected to the form of the certificate of analysis issued by the Dublin city analyst, who said the paste did not contain any menthol, camphor, or chloral hydrate. He mentioned that he was guided by the standard of the British Codex.

Counsel for the defence objected to any reference to the Codex, on the ground that it was not admissible and had no official standing in Ireland.

The prosecuting solicitor said that the standards set up by the British Pharmaceutical Codex had been accepted in Ireland for years, and he submitted that there must be very strong evidence to rebut those standards.

Counsel for the defence agreed that the British Pharmacopœia did not need to be proved; objection was to citation of the British Pharmaceutical Codex.

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

SITUATIONS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is exempted from the provisions of the Control of Engagement Order, or the vacancy is for employment exempted from the provisions of that order.

ALBRIGHT & WILSON Ltd., require a **CHEMIST** for Technical Service and Product Development work in the Alginate Department. Age 30-40, preferably with some experience in industry. Apply in writing to the MANAGER, Alginate Department, 49 Park Lane, London, W.1, with full details of education and career.

ASSISTANT WORKS ENGINEER required for construction and maintenance of Chemical Works in West Riding, Yorkshire. Applicant should be 25-35 years of age. Should have sound theoretical training and practical experience in mechanical engineering and chemical works plant. Salary approx. £600 p.a. Pension Scheme. Applicants should state age, full details of training and experience to **Works Manager, Box No. 2840, THE CHEMICAL AGE, Fleet Street, London, E.C.4.**

SITUATIONS VACANT

LARGE PETROLEUM COMPANY has vacancy in London for **CHEMIST** with experience in the **DETERGENT FIELD.** Age, 22 to 30 years. Applicants should have a University Degree in Chemistry, preferably an Honours Degree. Good prospects. Pension Fund rights. Write Box Z.K.421, DEACON'S ADVERTISING, 36, Leadenhall Street, London, E.C.3.

LARGE PETROLEUM COMPANY has vacancy in London for **CHEMIST** with experience in **SOLVENTS.** Age, 22 to 30 years. Applicants should have a University Degree in Chemistry, preferably an Honours Degree. Good prospects. Pension Fund rights. Write Box Z.L.422, DEACON'S ADVERTISING, 36, Leadenhall Street, London, E.C.3.

CROWN AGENTS FOR THE COLONIES

SCIENTIFIC OFFICER (ANALYTICAL CHEMIST) required by the East Africa High Commission for the East African Industrial Research Board for one tour of four years with prospects of permanency. Commencing salary will be between £760 and £935 a year according to qualifications and experience in a scale rising to £1,320 a year. Free passages and liberal leave on full salary. Candidates, preferably under 45, must possess a University Degree with Honours in Chemistry or an equivalent qualification. They should have had good experience in Chemical analysis particularly of clays, rocks and mineral ores. Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience and mentioning this paper to the **Crown Agents for the Colonies, 4, Millbank, London, S.W.1,** quoting **M/N/22686/3E** on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

SENIOR LABORATORY CHEMIST required by manufacturers of a comprehensive range of Bituminous industrial materials. Approximate salary £520 p.a. Please state in writing full details of qualifications, and experience of formulation and production, age and past appointments to **BITUMEN INDUSTRIES LIMITED, Farnham Road, Trading Estate, Slough, Bucks.**

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ELEVATOR, part steel enclosed, of the continuous chain and bucket type, buckets approx. 10 in. by 7 in elevator centres 63 ft., together with a 5 h.p. 40/1 worm reduction gearbox, but excluding motor.

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Several Ball Mills, 6 ft. 6 in. by 6 ft. 8 in., Silex-lined batch type, with driving gear and clutch.
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TEN—Andco 6 in. worm-operated **PLUG COCKS.**
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ONE—All-brass **PRODUCT RECEIVER,** 2 ft. 11 in. diam. by 3 ft. 10 in. deep.
TWO—All-brass **PRODUCT RECEIVERS,** 2 ft. 11 in. diam. by 4 ft. 9 in. deep.
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ANNOUNCEMENT

THE PUBLIC HEALTH (SMOKE ABATEMENT) ACT, 1926

AND THE

ALKALI, Etc. WORKS REGULATION ACT, 1906

NOTICE IS HEREBY GIVEN that it is proposed by the Minister of Health to make an Order under Subsection (1) of Section 4 of the above-mentioned Act of 1926.

(a) extending the list of noxious or offensive gases mentioned in Section 27 of the Act of 1906 above referred to; and

(b) extending the list of works mentioned in the First Schedule to that Act.

Copies of the draft Order can be purchased either directly, or through any bookseller, from His Majesty's Stationery Office, York House, Kingsway, London, W.C.2; 39, King Street, Manchester, 2; 2, Edmund Street, Birmingham, 3; 1, St. Andrew's Crescent, Cardiff; or Tower Lane, Bristol, 1.

NOTICE IS HEREBY FURTHER GIVEN that a **PUBLIC ENQUIRY** into the subject matter of the proposal will be held at the **MINISTRY OF HEALTH,** Caxton House East, Tothill Street, London, S.W.1, on Tuesday, the Eighteenth day of October, 1949, at half-past two o'clock in the Afternoon, by W. A. Damon, Esq., C.B.E., B.Sc., F.R.I.C., M.I.Chem.E., Chief Inspector of Alkali, etc., Works, who will then and there be prepared to receive the evidence of any persons interested in the matter of the said Inquiry.

H. F. SUMMERS,
Assistant Secretary.

Ministry of Health,
September, 1949. 9/49/13.

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